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Address.

MENTAL PITFALLS OF ADOLESCENCE.*

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So many conditions make for soundness of mind that the field of mental hygiene is a large one; but of all its aspects, none is of more vital importance than its application to the young adult. I shall endeavor, therefore, to give you some idea of the extent, nature and outcome of mental breakdown in youth, its principal causes and the possibilities in the way of its prevention which lie open to the parent, the teacher, the clergyman and the general physician. Widespread information on the subject is plainly called for in view of the large number of youths and girls who are annually admitted to our state and private hospitals for mental disease, and the ignorance of the general public as regards the special form of the disorder which is peculiar to adolescence.

The knowledge and application of the rules of bodily hygiene have, as everyone knows, long protected the adolescent from physical weakness, disease and injury. He is equally well guarded by private and public advice, training and example in the home, the school and the church against moral degeneration. Against ignorance he is educated in this country as in no other. But, against mental deterioration and

breakdown, little or no warning or advice is given him or his parents, as a rule, until he is placed under care in an institution.

Facts about physical disease come home to us. We are familiar with it from everyday observation and experience. We are impressed with accounts of its dangers, its terrors, perhaps, and the numbers of its victims. Mental disease, on the contrary, the most grievous of all diseases, though it may horrify in the abstract, seems very remote as a possibility in our own cases. It is usually the very last calamity we expect to have happen in the family and therefore no precautions are taken against it. If it were not necessary, because of the nature of their illness, to "put away" the mentally afflicted; if the secrecy about their condition, as though it were a disgrace instead of a disease contracted through no fault of their own, did not exist, people would be equally alive to the ravages of mental disease and the importance of the study and application of mental hygiene, or the science of mental health.

THE FREQUENCY OF DEMENTIA PRECOX AND ALLIED CONDITIONS.

How common is morbid mental change in youth, varying from minor states of instability to actual insanity, cannot be stated in percentages. Its lighter shades, although materially affecting the future life of the patient, rarely come under the eye of the institution physician, except in the psychopathic hospital, where incipient and borderline cases are numerous, although full opportunity for their observation and treatment is limited even there. Often the

* A Popular Lecture delivered under the auspices of the Massachusetts Society for Mental Hygiene in various cities and towns of the State during 1915-1916.

family physician is not consulted for these mild conditions, and when he is he either fails to recognize the disorder or belittles its importance. Consequently there is probably a large number of such persons in danger of mental breakdown who are without advice or other assistance.

But simply taking the known cases of the fully developed disease, the showing is impressive. It is safe to say that the majority of the 14,746 inmates of the Massachusetts state and private hospitals for the insane are cases—mostly chronic—whose disease began when they were young. They had then reached the end of the intellectual lives of which they were capable, became stranded on the rocks of adolescence, and were left mentally incapacitated for life. Of the 3264 new cases of mental disease admitted to the Massachusetts hospitals in 1915, 804, or over 21%, were suffering from dementia precox (as the disease we are considering is called) and allied conditions of adolescence. This yearly addition of cases of dementia precox, most of whom become chronic but remain physically well, causes them to accumulate until they soon form the majority of the inmates of our state hospitals. They represent one-third more admissions than the combined totals of all patients whose mental condition is due either to alcohol or syphilis—causes which are very rarely operative in producing this form of mental disease. Of all the classified forms of insanity, moreover, dementia precox claims by far the greatest number of victims.

Here let me say that this mental condition should not be confounded with mental defect or feeble-mindedness proper. It is important to bear this in mind. The mental defective, about whom wide public interest fortunately has at last been awakened, is one who had little or no mind to start with—who has been idiotic or imbecile from birth or infancy. On the contrary, most cases of dementia precox enjoy, up to the time of their breakdown, apparently sound and normal minds. A striking fact is the frequency with which the disease attacks adolescents of marked intelligence and promise. A German authority reports that large numbers of such patients are schoolmasters, the sons of schoolmasters and theologians. Statistics on this point give these figures: 27% men and 21% women had average intelligence before their mental breakdown; 55% men and 66% women had good and even remarkable intelligence; 18% men and 13% women were below the average intelligence, but were not mentally defective.

NATURE OF THE DISEASE.

Adolescence, by far the most critical period of mental life, extends approximately from the age of 15 to that of 25. It is in this developmental period, usually towards the end, that dementia precox, the form of mental disorder which is peculiar to youth, begins. It only rarely hap-

pens that it originates later than the completion of adolescence, although in some individuals full mental maturity is not reached before 30. Its name is derived from dementia, which denotes deterioration of the mind through loss of mental power, and precox, premature. In its essence it is an enfeebling of the previously healthy mind, a slow decline of mental strength through gradual weakening of the will and deadening of the emotions or mental feelings. It ends, generally after a few years, in permanent degeneration of the mind, sometimes light but more often pronounced and involving it in more or less complete disorganization. At the outset and throughout the course of the disorder may occur various kinds of mental disturbance appearing as "attacks," such as maniacal excitement, melancholic frenzy, simple depression, states of bodily rigidity (called catatonia), stupor, confusion of ideas and delusional states. Hallucinations, such as seeing or hearing non-existent sights or sounds, and sudden impulsive acts of homicidal or suicidal violence, are not uncommon. These manifestations do not all occur in the same attack although several of them may be combined in a single case.

FORMS.

The disease has been divided into several different sub-varieties, but I will only call attention to the simple form which, because of its mild nature, is more frequently met with outside the hospital. The other more pronounced and severe types, common in hospitals, need no further mention. These cases of simple dementia are far less striking and very insidious in their development. The principal feature is change in the youth's character, in the shape of a gradually developing mild apathy and indifference. If in good circumstances, he usually spends his life in indolence, varied by spasmodic and aimless activity, and tends to develop obsessions, antagonisms and anti-social proclivities. The poorer patient so afflicted is often a tramp, a crank, a criminal or a prostitute in the making. The "hobo" class is largely recruited from these mental derelicts. Wilmans, in 127 vagabonds, found 66 cases of dementia precox. This form is a common one, but most of the cases do not reach the hospital for the insane.

ITS APPROACH.

Familiarity with the premonitory symptoms of dementia precox is most important, as it is more than likely to be very helpful toward checking or minimizing further trouble if medical advice is sought in time. Therefore, I shall not apologize for giving them in detail. The early indications of the disease, which appear gradually, as a rule, are practically the same whatever form it may afterward assume. In all of my cases, in which intimate knowledge of the earliest manifestations was attainable, lapse in the power of attention—of mental concentration

—has come first. An ambitious student complains: "I cannot any longer wield my mind, which has become my master instead of I being master of it"; "I feel no exuberance as before"; "Everything is a dead weight"; "The feeling clings to me and I cannot fight it off." A bright lad, taking high rank in a preparatory school, grows despondent at finding himself becoming "dull," "stupid," and "weak," and begs to be helped, as his utmost endeavors to go on have failed. The girl in this situation feels for the first time that "she must struggle to be like other girls." The patient also becomes more easily fatigued physically than before and loses directive energy and initiative. With increasing mental failure the fruitless efforts are soon abandoned, the mind becomes more inactive, forgetfulness, depression and indolence replacing alertness, ambition and energy. He "wants to be let alone," becomes listless, apathetic, and careless, gradually slipping into a dulled condition of mind. Many become over-conscientious, depressed and self-reproachful. Avoidance of others follows and paves the way for suspicion of those about them, the starting-point it may be of future hallucinations, delusions, and overt acts. Suicidal thoughts may now appear. Adolescent patients of another type, when no longer able to meet even the minor demands of life, and physically fatigued, become easily upset and very irritable, as well as unexpectedly fault-finding and very angry over trifling matters. Marked indecision and constant demand for reassurance regarding the plainest matters of duty are common.

The train of thought naturally becomes interrupted early and may even show signs of the approaching mental confusion of the next and active stage of the disease. Lapse in judgment is shown in the development of unnatural prejudices, sudden and needless alarm at ordinary occurrences. Some patients begin by worrying over their physical condition, believing that their bodies or some bodily functions have undergone a change. Self-control may be early undermined, and strange conduct follows, such, for example, as unnatural and even grotesque infatuations, indiscriminate proposals of marriage, etc.

Sudden and unexpected acts, forerunners of the more pronounced impulsive states of the acute stage, are common, such as exhausting walks with no object after a long period of idleness; unexplained destruction of belongings, etc. Unlooked for transients of mood and the lack of depth in the patient's depression or anger, characteristic features of the disease through its entire course, are early manifestations, as are also inconsequential speech and aimless effort.

The general appearance of the patient is that of apathy or mild depression, except at times of unexpected and transient animation. Lack of

energy also is constant, except during spasmodic outbursts of misdirected activity or prolonged over-work or exercise. Although such patients, owing to irregular ways of living, sleep more in the daytime, insomnia is developed early. The appetite is capricious. Headache is frequent, and, as Mairat believes, a highly important symptom at this juncture. It is sometimes a severe, persistent and protracted pain, but more often a disagreeable, vague sensation as if, for example, the head were "empty" or "filled with cotton wool." Nightmare is common. A generally weakened, relaxed, poorly nourished bodily condition is usual and is shown in loss of weight, pallor, dilated pupils, low temperature and weak pulse. Menstrual irregularities are rather frequent. In not a few cases the group of premonitory symptoms bears a deceptive resemblance to neurasthenia proper or "nervous prostration," owing to the predominance, for quite a long period, of nervous and bodily debility.

THE SOURCES OF DEMENTIA PRECOX.

Authorities differ as to the prime cause of the disease, one group favoring a physical, the other a psychic origin; but wherever its germ, so to speak, may lie, the character of the mental soil in which it takes root and flourishes and the conditions which excite it to full development are well known to the psychiatrist.

One of the profoundest, although more remote, influences in originating dementia precox is the time of life in which the disease prevails, —the period of puberty and adolescence, of growth, development, immaturity. Almost all modern writers on psychiatry, even those who lay special stress on the influence of faulty heredity, are fully alive to the great importance of this critical time of life in fostering mental disease, and in all probability we shall have to seek for the real causes of its origin in the normal physical and mental variations of this period of development.

To appreciate the possibilities of this time of life in the way of mental deterioration we have only to call to mind the unusually rapid growth of the organism in every tissue, the new and powerful activity of all the functions, especially those of nutrition, in the progress toward complete development, and the stamina and often the care that are essential for properly meeting the demands of this revolutionary period. The disturbance of the heretofore tranquil nervous system by the advent of the reproductive functions is a vital change, and the proper adjustment of this part of the organism to the working whole is of far-reaching importance, as the genital activities have a profound effect on the entire system and the developing personality. During adolescence the normal mental condition is not a solidly settled one, and at this time, if ever, should we expect to find pathological disturbance when impressionability, instability of

purpose, variation of mood, excitability, impulsiveness, ambition, independence, and intolerance are most likely to be in full play; when the affections, emotions, and newly awakened sexual feelings and passions are most keen; when reflection and judgment are immature, and, above all, when self-control, which should regulate all, is itself in an imperfect stage and in danger of being unequal to its function. Nothing is more significant of the causative influence of this period than the resemblance of the clinical picture of dementia precox to these ordinary mental elements of normal development which in morbidly exaggerated form constitute the different manifestations and phases of the malady.

When to this developmental factor is added the special mental make-up, sometimes improperly called temperament, of many of these patients, the soil is thoroughly prepared for the growth of the disease. From childhood these individuals are, as a rule, well behaved and easily trained because they shun opposition and struggles from lack of normal vigor and strength of purpose rather than from any inherent virtue. Their tendency to shrink from coping with the world, due to a faulty habit of adjustment, resolves itself into the "shut-in" personality which typifies these cases. This factor, so important in determining the causation and prevention of the disorder, was first recognized by Meyer and Augustus Hoch who found that a large number of cases occurred in persons who, as Hoch puts it, had "no natural tendency to be open and to get into contact with people and things about them, who were reticent and exclusive and could not adapt themselves to situations, who were hard to influence and often sensitive and stubborn, but the latter more in a passive than an active way. They showed little interest in what went on and frequently did not participate in the pleasures, cares and pursuits of those about them; although often sensitive they did not let others know what their mental conflicts were; did not unburden their minds, were shy and had a tendency to live in a world of fancies."

Many of these sensitive natures suffer in silence at their imagined inferiority, always expect to fail in their efforts to please others or to succeed in their studies or whatever they may undertake. Their pride is easily wounded and they are ever ready to believe themselves slighted. They are excessively over-conscientious, magnify their faults and mistakes, and live in constant fear of what people will think of them. Consequently remorse and shame cause them much suffering except when their troubles are crowded out for the time by everyday duties. Their diffidence and exclusiveness too often pass among their young friends for haughtiness and self-conceit and thereby cause criticism from others—the very thing which they are so anxious to avoid. Submerged and repressed factors which occasionally torment the

adolescent of this type and which the psychoanalyst tries to bring to light and correct are early sexual experiences which are usually exaggerated. The constant and often growing mental conflict caused by the repression of these thoughts is an added strain which is sometimes the precipitating cause of nervous breakdown. Then, too, these youths tend to dwell upon ordinary longings which the normal mind ponders on but puts aside. Hoch found the "shut-in" personality markedly pronounced in 35% and indicated in 16% out of 72 cases of dementia precox.

Another type is the precocious youth, the student who is more or less of a prodigy, a phenomenon. Such subjects are particularly prone to mental breakdown in adolescence owing to the readiness with which their abnormally active minds may be over-stimulated in every direction.

One cannot fail to be impressed also, with the large number of cases of dementia precox which present a family history of mental or nervous disease. Nevertheless many distinguished psychiatrists deny that disease-heredity is a powerful predisposing influence. Kraepelin, the foremost authority on the subject, comes to no definite conclusion on this point, but seems to be opposed to regarding this disorder as a form of degeneracy. He points out that heredity does not appear to be more frequent in dementia precox than in certain other mental diseases and that the best known constitutional disorders, such as hysteria, manic-depressive insanity and psychopathic states do not lead to a mental deterioration but to a periodic recurrence of symptoms with intervals of perfect health which are often long. Statistics on this point are quite diverse.

Badly directed education, moral and mental, may give a wrong turn to the tendencies of the nervous child and thus leave him with little defence against the exciting causes of mental disease when adolescence is reached.

PRECIPITATING CAUSES.

The precipitating causes are various, but for the most part are of the nature of exhausting influences—mental and physical strain. These are the most conspicuous and powerful of the exciting causes of the disease. Rapidly-growing youth or girls in the humbler walks of life, apprentices, clerks, train hands, stable boys, mill operatives, domestics—often succumb to the exhausting effects of hard and continuous physical labor combined with long hours, anxiety, little sleep, insufficient food and in consequence disorder of nutrition. Insomnia and lassitude arise and mental breakdown follows, sometimes apparently without the aid of any predisposition to mental disease. Youthful volunteers not inured to military discipline and the hardship and dangers of active service also recruit the ranks of the youthful insane. Social strain in girls

with its attendant factors of malnutrition and fatigue as well as banting may precipitate mental breakdown in predisposed cases. Over-study, of itself rarely productive of mental disorder, causes many a delicate girl or lad of the "shut-in" type to succumb to mental disease when poor circumstances increase the struggle for education. Rapid and excessive growth in height, without corresponding weight and proportionate development, is recognized as abnormal. It is not uncommon in this type of adolescent and may sometimes precede by a little the development of the disease. In these instances there is not sufficient alimentation provided to meet the demand of the growth of the organism *plus* excessive mental and bodily energy.

Self-abuse, if the degrading habit be carried to great excess, and if the child or youth be of the nervous type, is apt to be exhausting and to cause general depression and languor, lessened power of attention, poor memory and dullness; but as ordinarily practised,—and the habit is well-nigh universal in youth,—its results, according to accepted medical teaching, are, as a rule, not so directly disastrous as was formerly believed to be the case, and are more often moral than physical or mental. Contrary to popular belief, masturbation is almost never the cause of mental disease or defect. Melancholy subjects of dementia precox, with delusions of wrongdoing and general worthlessness, often accuse themselves of previous excess in the vicious habit who on recovery admit that they had seldom practised it. Many of its symptoms are purely nervous in character, and are due to shame, anxiety and loss of self-respect, due to a consciousness of a debasing weakness which is universally condemned.

Typhoid and other debilitating diseases occasionally leave the patient in a permanently weakened mental condition culminating in dementia precox. Child-birth and its attendant conditions, with its many disturbing influences, is sometimes the starting point of mental breakdown. Aschaffenburg found 56 cases of dementia precox in 118 cases of so-called "puerperal insanity." Finally, it may be impossible to find any adequate cause for the attack, a small proportion of the cases occurring in the physically strong and apparently stable and socially inclined.

SEX.

No reliable data have thus far been recorded which indicate in which sex the disease is more common. Not a few authors find the disease more prevalent in young men.

THE PROGRESS OF THE DISEASE.

There is the greatest variation in the manner in which the disease may progress. In the great majority of cases the first attack may be and usually is more or less pronounced and severe and lasts all the way from three to eight months or a

year, to be succeeded by a remission of symptoms to such an extent that the patient appears to be entirely well and is able, it may be, to live at home. After a time, however, sometimes a year or more, he begins to become easily exhausted in mind and body, sleeplessness sets in and a relapse occurs with deeper dementia though somewhat less acute symptoms. From this attack also he may emerge but, with the mind on a still lower level of strength and rationality, he again relapses and finally the mind permanently succumbs. Others do not have separate attacks but gradually sink into permanent dementia. A large proportion of cases never recover their reason although their physical health becomes and remains good and even excellent.

These temporary recoveries are frequent in dementia precox but substantial recoveries are much more common in other forms of mental disorder. Nevertheless, a certain proportion of dementia precox cases, once estimated by Kraepelin at 13%, appear to get well permanently after one attack and continue ever after to fill their accustomed stations in life to a large extent as well as before, although, as a rule, they never appear entirely the same in the opinions of near relatives in some detail of endurance, judgment or conduct. Other victims of the disease may live on comfortably outside of the hospital but are plainly on a lower mental level than those about them and are regarded as "non-compos." The remainder become irretrievably demented, inactive in mind and body, automatic in their movements and of varying degrees of helplessness, requiring more or less constant personal care. This class of patients, particularly serve to swell the constantly accumulating aggregations of chronic patients in our institutions.

EFFECTS OF TREATMENT.

Improved methods have, of late years, unquestionably tended to benefit the condition of these patients and increased the number of recoveries in our custodial state hospitals. Nevertheless, aside from protecting the patients from neglect, injury to themselves and others and the disturbing influences of outside life, securing their physical well-being and providing occupations and occasional diversions (and a vast amount of excellent work is done in these directions), comparatively few curative results are possible for the majority of them where large numbers are cared for together. It is in the treatment of the *individual* patient that the chances of recovery or improvement are greatest, and the nearer we can approach to this wherever the mental case is under care the better will be the results. By employing resident social workers who interest themselves in the individual patient and his affairs, and increasing the number of nurses, the superintendents of our institutions are now making more progress in this direction.

THE OUTLOOK.

This is indeed a gloomy picture. It has its counterpart in the condition of sufferers from tuberculosis before the public interest in the subject was awakened and a crusade begun to prevent its ravages. Compare the situation of the consumptive of that day and this. What remarkable progress has resulted in public enlightenment in hygienic measures for the prevention of the disease, in general recognition of its earliest symptoms and in advanced methods of treating the developed disease. At that time it was generally looked upon as an incurable disorder. Once the diagnosis had been made of phthisis, as consumption was then called, the patient was supposed to be doomed. Now recoveries are not only frequent but expected when the case is taken in season, and when relapses occur the intervals of health are prolonged under comfortable conditions by our modern means. Statistics tell the story of the diminution of deaths from this cause of late years. In the early days of the movement no one would have ventured to predict such a general public awakening and such encouraging results.

The situation is to a considerable extent the same as regards mental disease, and the outcome, though less pronounced, will be no less surprising if the mental hygiene movement, both national and state, which is now in its infancy, shall take an equal hold upon the sympathies and interest of the public.

IMPORTANCE AND MEANS OF PREVENTION.

The chief aim of such organized effort should be the adoption of preventive measures, as they are the main reliance, the anchor to windward against the disease. As a means of combating it, they are infinitely more effective than treatment instituted after it has once gained a foothold; and it is here that the help of parents, teachers and general physicians is indispensable. Familiarity with the remote influences, the precipitating causes and the earliest symptoms of mental deterioration in adolescence is of great value, and not only, be it understood, in warding off the malady but also, by the way, in throwing much light on the traits and trends of the minds of youths and girls who are normal and sound in mind and body. No one has made this plainer than Stanley Hall, our foremost authority on the psychology of adolescence. "One of the missing links," he says, "which are indispensable to full acquaintance with the many forms of precocious mental decay, is the absence of record or available knowledge of the early stages in the development of the disease before cases come to asylums; for of this disease, even more than of many others, it is certain that if all were known, its manifestations would be found to be numerous in proportion as they are mild, and that the vast majority who are slightly impaired by the ferment of this storm and stress

period of life never come under any kind of medical observation. For one I incline to the opinion that just in proportion as these gaps are filled we shall have less need of recourse, with Kraepelin, to toxic and other chemical cause. The paradigms of premature decay," by which he means its parallelisms with the manifestations of the inner and outer life of normal youth, "reveal a body of phenomena of the highest importance for normal genetic psychology, and it should be asserted that no parent, judge, family or army physician, and especially no teacher, should be ignorant of these morbid forms which, in their mild degrees, are so common and the key to so much that is normal, but which are generally concealed to others and often unconscious to self."

Now, mental, like physical, illness, comprises many different "diseases"—between 35 and 40 all told. Some are more curable than others, and some are inevitably hopeless. Dementia precox has been placed, and rightly so, if we have regard only to *past* results, between the two, that is, in the less curable class, but that should not be taken to mean, by any means, that it is not preventable. On the contrary, it is now accepted by those expert in the subject that much of the disease may and should be prevented.

As Campbell of the Johns Hopkins Hospital puts it: "the researches of Kraepelin, Freud and Jung of Germany, and Meyer and Hoch in this country, show that under proper guidance and control many cases of functional nervous disease and insanity are of such a nature as to be manageable and preventable. It is clearly obvious that, of the enormous number of persons who, as a result of hereditary tendencies, are susceptible to nervous and mental breakdown, many could be saved by proper assistance during the developmental stage." Among the preventable conditions which he considers the most hopeful he places dementia precox first. He classes 39% as manageable and preventable.

Unfortunately, the theory of degeneracy has become so deeply ingrained in people's minds that a surprisingly large number still believe that all mental disease is on a par with idiocy and imbecility and that it not only cannot be really cured but is impossible of prevention except in some future generation through the admixture of healthy stock. We have far too long lain back content in the belief that it is one of nature's methods of weeding out the unfit, and the mental weakening of this type has been excused for giving rein to his morbid tendencies and his guidance neglected because his father or mother was a criminal and inebriate or insane. It is largely for these reasons that no systematic scheme of prevention has ever been tried for the insane until the recent public instruction in mental hygiene was undertaken.

The practising psychiatrist and the neurologist not infrequently are consulted by patients

with unmistakable symptoms of approaching dementia precox in its very earliest stage, and not a few, under close supervision, change to healthful open-air and congenial but quiet surroundings, suitable companionship and careful following up of their cases, have been restored to rationality, calm of mind and enjoyment of life. Some seem to have recovered; others, if they have not been fully brought up to their original mental level, are at least able to be of some use in the community. In this way occasional cases that seemed doomed to lifelong commitment to a hospital for the insane have been saved. So far as they go, therefore, these results constitute object lessons of the effects of prevention. So, too, the intervals of comparative health occurring between attacks are frequently prolonged when the patient is kept track of by the physician and led to make frequent reports of his progress. In this way relapses may be warded off for a much greater length of time than would have been the case without such supervision. But prevention from this source cannot go far as it is comparatively seldom that such cases reach the physician in time owing to the prevailing ignorance of the danger signals or the refusal of the patient to coöperate. Fortunately, psychopathic hospitals and wards are now receiving more of these early cases, which formerly would have shrunk from going to a state hospital.

Nor should we wait until medical advice seems necessary. It is just here that the help of the parent and teacher may be of the utmost service. They should not only make themselves familiar with the signs of its approach in order to summon medical help in time, but should strive to familiarize themselves with the morbid tendencies that I have endeavored to describe, so that, when possible, they may so direct the lives of their charges that strain and other dangers to young minds predisposed by heredity or temperament to breakdown may be avoided. The "shut-in" type of lad or girl, in which the disease takes root most quickly and frequently, should be generally recognized. It should become a matter of common knowledge that just as a special physical make-up or conformation may betoken tuberculosis so there is in many cases of dementia precox a particular kind of personality which favors its development and calls for precaution in the way of training, environment and mental and physical hygiene. In families of the ignorant and unthinking these danger signals pass unnoticed, but intelligent people may learn the lesson and profit by it, if it be brought to popular knowledge as an accepted scientific fact.

Every endeavor should be made to pierce the shell of secretiveness which envelops these minds, to gain their confidence, and without too much preaching explain to them how needless are their self-depreciation and their fears; how exaggerated are their ideas of

past experiences, especially the sexual, and how mistaken they are as regards their consequences. Girls should have the nature of menstruation and the precautions it necessitates early made plain to them. Boys should be led to look upon occasional semital losses during sleep as a natural occurrence. Many a frightened youth, for want of a father's foresight and prudence in this direction, has fallen into the hands of quacks, who have worked upon the fears of their victims until they have become morbidly depressed and hypochondriacal. Parents should also see to it that their children are kept from the first in the companionship of other children and take part in the healthy pursuits and pleasures of their mates. They should endeavor to implant normal mental processes in incipient cases and regulate their methods of thought, study, reading, exercise and conduct.

But these means of prevention are often difficult to put into effect in dealing with such inaccessible natures, although they should never be neglected. Fortunately there are other and more tangible means of strengthening the resistive power against morbid tendencies in the direction of bodily nutrition and development and regulation of physical and mental effort in the school, in sports, in the family, in society and in other activities.

To begin with, it is important that special attention should be paid to the accumulation of a reserve fund of bodily nutrition with which to sustain the growing system, especially of the delicate youth, and protect it against physical or mental fatigue. Every possible means should be availed of to prevent such subjects from acquiring the habit of taking irregular, insufficient and unwholesome food. They are liable to develop lasting hypochondriacal fancies which might never arise if they had been trained early in this direction. Louis Starr, writing on the adolescent period, recognizes this danger and believes that bad eating habits lead to many breakdowns of students and cause irritability, anemia, malnutrition and a condition of weakness in which marked fatigue follows such trifling exertion that exercise is precluded and a craving for stimulants engendered. It is essential, therefore, to establish an appropriate diet during puberty. If correction be neglected until after sex development be completed little improvement can be expected. A great many young people are inadequately fed, especially the only child, who is supposed to be delicate. Tracy and Crossdale, in a series of observation-tests made during the past year upon 127 typical students at the Philadelphia Normal School for Girls, found that only about one-third of them took three substantial meals a day while the rest depended too largely on hastily-snatched breakfasts and lunches of sweets and pastry and often missed meals altogether. The effect of these habits was easily seen in the general health of the students. There

was a distinct difference in the powers of endurance and vitality of certain girls whose diet was more solid and substantial than the others. Much more does the rapid growth of the young and their enormous and incessant activity of body and mind demand a full and regular supply of nutritious fuel, and they can hardly eat too much. This is especially true of the nervous child who should never be stinted and always encouraged, but never nagged, to eat plenty of all kinds of nutritious food, avoiding perhaps too marked a preference for meats.

The general principles of prevention laid down by Sir Thomas Clouston, the famous Scotch psychiatrist, are practical and to the point. "Build up the bone and fat and muscle by means known to us during the period of growth and development. Make fresh air the breath of life of the young. Develop lower centers rather than higher where there is a bad heredity. Do not cultivate, rather restrain, the imaginative and artistic faculties and sensitiveness and the idealisms generally in cases where such tend to appear too early and too keenly. They will be rooted in a better brain and body bases if they come later. Cultivate and insist upon an orderliness and method in all things. The weakly neurotic are always disorderly, unbusiness-like and unsystematic. Fatness, self-control, and orderliness are the three most important qualities for them to aim at."

I have alluded to the occurrence of attacks of so-called "nervous prostration" during adolescence. They are in reality mild, transient episodes of mental instability and are frequently the starting points of impaired mental stamina whose effects may not come to the surface until later in life under stress of some sort, in the shape of a sharp mental breakdown. It is of importance, therefore, to bear such a possibility in mind in order that the future lives of such individuals may be judiciously ordered and any return of nervous symptoms be promptly met.

Insufficient sleep in the young calls for precautionary measures in the way of less study and more food, fresh air and exercise. Decided loss of flesh with or without any especial mental change should put us on our guard against mental or nervous breakdown in the predisposed and the delicate. Such loss of flesh is not confined to physical disease alone, as is usually supposed. Parents are apt to regard too lightly such indications, and the boy or girl concerned rarely admits mental or bodily tire, in fact does not feel it in most cases, as anaesthesia (absence of physical sensation) of fatigue is not uncommon under these conditions. The adolescent in school or college should be sent home and looked out for without temporizing whenever signs of insomnia, loss of appetite or decided lack of his usual energy and interest in work or sport become evident.

Overstrain in physical effort calls for especial precaution and, while mental and bodily cod-

dling should be discouraged, it should be borne in mind that nervous children become readily exhausted in both directions, and should be guarded so far as possible against pushing exertion to the point of daily fatigue. At the same time plenty of systematic open-air exercise, graduated to the individual's strength, should be encouraged. I have alluded to the necessity for restraint of the mentally precocious boy or girl. The physically precocious also come in for a word of caution. I refer to the very tall, thin, overgrown youths with this mental makeup. If such subjects always could be kept from physical over-exertion and athletic competitions, there would be fewer mental breakdowns.

Over-study is too often singled out as the cause of mental breakdowns; whereas the combination with it of other factors, such as rivalry, the expectations of the student's family, overstimulation of his efforts by the parents, straitened circumstances and other sources of anxiety, as well as unhygienic living, is really responsible for the result. Nevertheless, there are not a few nervous children and adolescents, particularly the dull and backward, for whom much mental application is harmful. These subjects should not be forced, and the time spent in study by any boy or girl should never exceed five hours a day, with intervals for rest and exercise. It has been shown that children who study longer than this suffer more illness than those who understudy, and this is more noticeable the younger the scholar, as there is less resisting power.

For shy, sensitive, self-conscious, perhaps over-mothered boys or girls in good circumstances, the routine and associations of a well-selected preparatory school at a distance from home, where the right moral tone, discipline, physical training and an out-of-door life are important features of the school methods, and where they will realize that each of them is but one of many pupils, is an excellent corrective and upbuilder of mental and bodily strength and character. For the more highly nervous this occasionally proves too severe an experience, but it never need be disastrous, and it often happens that the doting and indiscreet parent gives it an insufficient trial. It is generally admitted, according to Stanley Hall, that girls in good boarding schools where evenings, food and regimen are controlled, are in better health than day pupils with social, church and domestic duties and perhaps worries, to which boys are less subject.

Social service work, both professional and amateur, should only be undertaken by the strong and vigorous girl. It calls for constant effort of the most taxing kind, and the anxious-minded, over-conscientious, delicate and determined worker is more than likely to suffer physically and nervously under the strain, besides exposing herself to the danger of mental breakdown. On the other hand, the high pressure of social gaiety when a girl is "coming out" is

only well withstood by the normal, healthy and vigorous girl, and even she is usually pulled down in flesh and spirit when the festivities are over. Late hours, loss of sleep, insufficient nourishment and a feverish unrest are accompaniments of this season, and occasionally have been the precipitating cause of nervous breakdown in the delicate. At all times the cultivation of healthy commonplace activities is the most beneficial course.

Effort at the prevention of mental disease among the poor must perforce be largely confined to the dissemination of simple instruction in mental hygiene through popular lectures, and especially the oversight given to convalescent and presumably recovered sufferers from dementia precox on their discharge from the hospital, through after-care and social service channels. By following up these cases, regulating their home lives and family surroundings, helping them to secure suitable employment and, in general, improving the condition under which the original breakdown occurred, it is sometimes possible to ward off, or at least, delay relapses. For this class this is among the most promising means of prevention. I must in this connection again urge the advantages of psychopathic hospitals with out-patient and social service departments for meeting the disease in the early stages. Nowhere else can the incipient cases among the poor be reached and treated with better prospects of success.

After-care applies with much greater force to cases of dementia precox occurring in the well-to-do for, when once an attack has been experienced, the dread of a relapse causes the more sensible and intelligent to listen to medical advice. They recognize more readily their limitations, and their relatives and their means enable them to escape the sources of fatigue and anxiety to which the poor are subjected.

Massachusetts Medical Society.

PAPERS READ AT THE ANNUAL MEETING OF THE MASSACHUSETTS MEDICAL SOCIETY, WEDNESDAY MORNING, JUNE 7, 1916.

THE COMMUNICABLE DISEASES OF CHILDHOOD.

I.

THE RELATION OF THE STATE DEPARTMENT OF HEALTH TO THE COMMUNICABLE DISEASES OF CHILDHOOD.

By ALLAN J. McLAUGHLIN, M.D., BOSTON.

MODERN health departments have expanded far beyond the field of communicable diseases

and now contemplate in the scope of their work all defects and deviations from the normal, whether due to germs or to other causes.

Teaching personal hygiene and attempting to keep people healthy does not mean that we intend to relax our efforts in the control of epidemic disease. We must hold what we have gained and try to go farther toward the elimination of communicable disease. The fact that typhoid fever has been reduced in Massachusetts to less than 8 deaths per 100,000, and that there are less than 275 deaths annually in Massachusetts from that disease, does not signify that we shall relax our control over water supplies and sewage disposal. Similarly, a continued effort with redoubled energy is necessary further to reduce the death rate for diphtheria, scarlet fever, measles and whooping cough.

In Massachusetts in 1914 the chief factors in our mortality were the following:

Infant mortality.....	9894
Pneumonia	5987
Organic heart disease	5428
Tuberculosis	5061
Cancer	3586
Bright's disease	3057
Apoplexy	2806
Syphilis	?
Diphtheria	632
Typhoid	268
Scarlet fever	246
Whooping cough	225
Measles	149
Influenza	129

Measles and whooping cough are much more serious than the figures indicate. A considerable proportion of deaths charged to pneumonia are really chargeable to measles and whooping cough. Important results have been secured in measles by research workers in regard to the period of infectivity and modes of transmission. Education of school teachers and parents in the early signs of this disease promises much in reducing measles still further. We are peculiarly fortunate in having recognized experts like Dr. Place and Dr. Morse discuss these two interesting factors in our death rate.

Our knowledge of scarlet fever has been augmented in the past year by the brilliant researches of Mallory, and the committee is to be congratulated in securing from Dr. Mallory himself a paper upon this subject. Scarlet fever will also be discussed by one of the foremost sanitarians in the United States, Dr. Charles V. Chapin, who, from long experience and ripe judgment, will give us valuable suggestions for the suppression of this disease.

In spite of the enormous reduction in diphtheria during the past two decades, I am not satisfied with the results at present. Considering the high standard of Massachusetts physicians, the free facilities for laboratory diagnosis, the free distribution of antitoxin and material for the Schick test, it is hard to understand that we have over 600 deaths a year from this easily preventable disease. The State Department of Health made an investigation of all

deaths from diphtheria in the past year, hoping to collect data which would show wherein the fault lies.

Is antitoxin given early enough? Is it given in sufficient doses? I am inclined to think that the physicians are not at fault in the bulk of the cases. Our investigation is not complete, but tends to show that in a majority of cases which prove fatal, the doctor is not called until too late.

It is a great privilege to hear an expression of opinion based on vast experience from Dr. Park of New York City, and it will be interesting to hear Dr. Hitchcock discuss diphtheria from the point of view of a district health officer of Massachusetts.

I desire to express my appreciation to the Society for the privilege of opening the session on the subject of the communicable diseases of childhood. I look upon it as an opportunity for improving the efficiency of our work in the state by applying the valuable suggestions which we will receive from the scholarly papers of Dr. Place, Dr. Mallory, Dr. Chapin, Dr. Park, Dr. Morse and Dr. Hitchcock.

II.

MEASLES AND THE PUBLIC HEALTH.

By EDWIN H. PLACE, M.D., BOSTON.

OUTLINE.

I. Mortality.

- A. American cities—low.
- B. English cities—Liverpool, Glasgow, London.
Liverpool chart. Measles greater than scarlet fever and diphtheria.
- C. Fluctuation in incidence.
Boston chart.
1. Causes: Exhaustion of material, etc.
- D. Fluctuation in mortality.
Liverpool chart.
- E. Boston mortality.
Contrast with scarlet fever.
- F. Errors in records.
1. Cases not seen and reported, 10%?
2. Confusion in diagnosis—toxic rashes and rubella.
a. Histories of second attacks, etc.
b. Rubella; distinct disease.
(1) Diagnosis.
(a) Incubation.
(b) Invasion stage.
(c) Eruption.
(d) Lymph nodes.
(e) Koplik spots.
(f) Severity.
(g) Immunity.

II. Methods of control— isolation, reporting, disinfection and quarantine.

A. Isolation.

1. Failure; few escape.
a. Susceptibility.
b. Contagiousness early.
c. Koplik spots.
(1) Appearance.
(2) Differentiation.
Bubbles.
Food.
Detritus.
Thrush.
Stomatitis.
Trauma.
(3) Location.
(4) Time and duration.

B. Disinfection.

1. Early death of virus.
2. Communication to others direct.

C. Quarantine.

1. Value.
2. School.

D. Results. Postponing of disease.

III. Manner of spread.

- A. Period of contagion, carriers, desquamation, late discharges.
- B. Direct contact.
- C. Droplets.
- D. Locus of virus—nose, throat and blood. Animals.
- E. Point of entry.
- F. Characteristics of contagiousness.

IV. Measures of management. Importance.

- A. Mortality—due to broncho-pneumonia.
- B. Prevention of pneumonia.
1. Sunshine, fresh air, free fluids, rest in bed, regulated diet.
2. Conditions actually found.
3. Fear of eyes.
4. Heat treatment.
5. Draughts.
6. Local resistance.
a. Mouth and nose.
b. Larynx and trachea.
7. Protection from infection.
- C. Limit of influence of these measures.
1. General condition and nutrition.
2. Other diseases.
- D. Conclusion.

In American cities, the mortality of measles is relatively low and but little attention is directed to it.

In English cities, on the other hand, as Liverpool, Glasgow and London, and in Paris and Petrograd, the measles mortality has been very high for years.

In Liverpool measles is a more important factor in the death rate than scarlet fever and diphtheria combined. (Chart 1.)

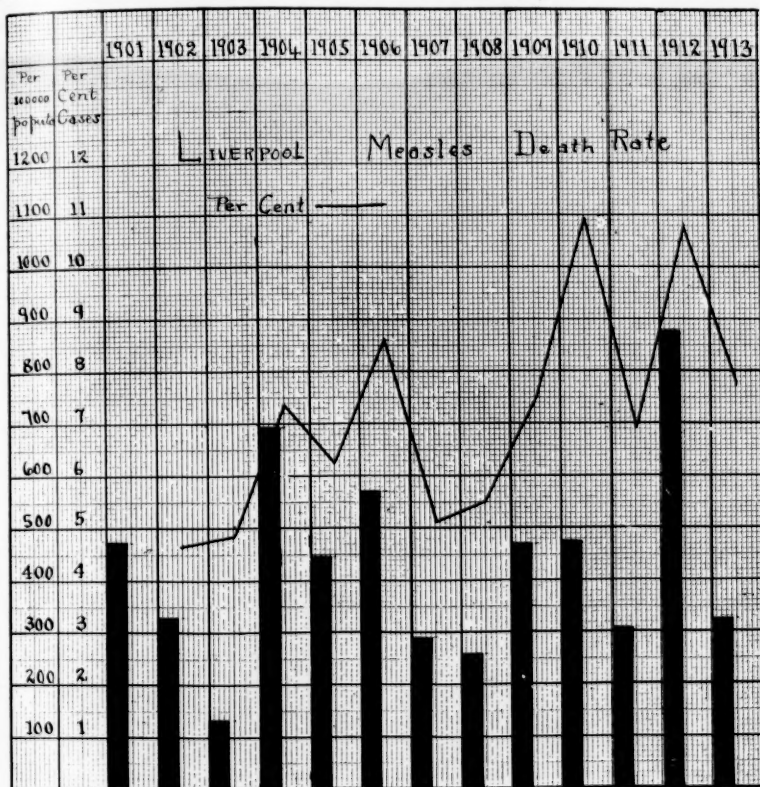


CHART I.

There is a marked fluctuation in the occurrence of measles as shown, for example, by Chart II of measles incidence in Boston.

This fluctuation in incidence is apparently due to a variation in the number of susceptibles. After each epidemic year in a community there follow from one to four, usually one to two, years of low incidence, until a sufficient number of susceptible children have grown up to supply fuel to the spark of contagion.

There is a corresponding fluctuation in the case fatality rate, extensive epidemics being usually associated with a more fatal form of the disease. This is shown in the records of Liverpool, as seen in Chart I. A rise in the total deaths and cases is accompanied, as a rule, by a rise in the case fatality rate.

In Boston the mortality rates, both case fatality and for every 10,000 of the living, have shown no definite downward trend during recent years. This is shown in Charts I, III and IV.

Charts III and IV show Boston's measles and scarlet fever mortality contrasted.

As compared with scarlet fever, it is seen that, for the last ten years, measles has been a greater cause of death than scarlet fever. This is not due to an increase in measles fatality but to a decrease in scarlet fever death rate.

Many errors occur in the records of measles which make figures open to some doubt.

First, many cases of measles are not seen by a physician and are not reported to the health department. This is especially true of mild attacks and of secondary cases in a family. In my histories, which show measles as having occurred previously, nearly 10% were not seen and diagnosed by a physician.

Second, confusion in diagnosis with toxic rashes and rubella, or German measles, is very common. Histories of second and third attacks, and even fourth and fifth attacks, are fairly common, while real second attacks are exces-

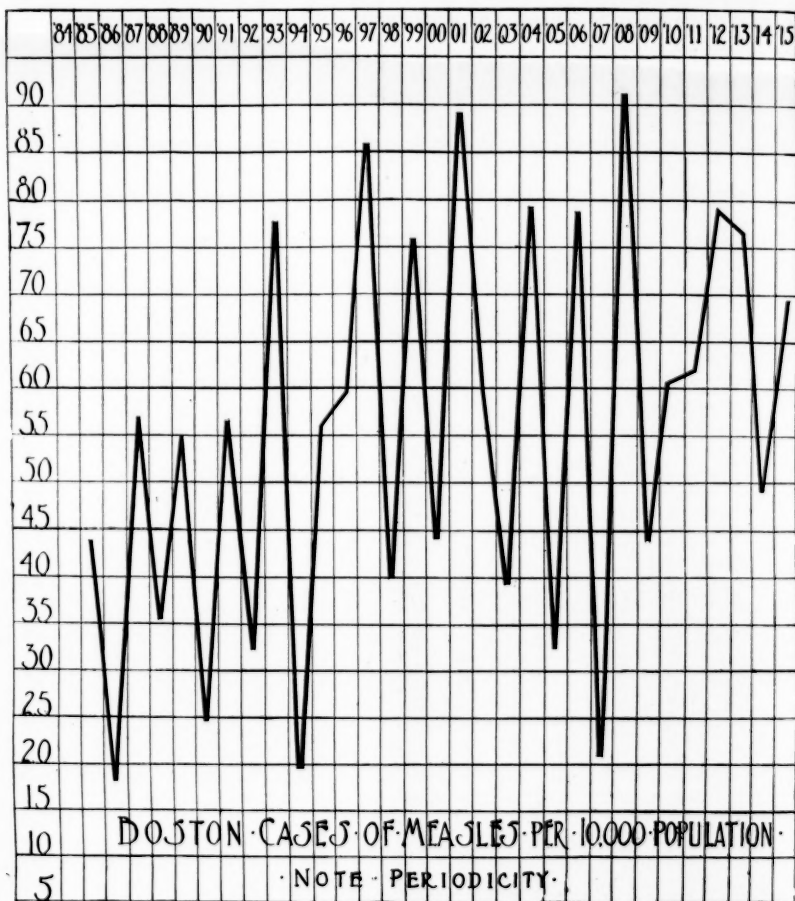


CHART II.

sively rare. I have not seen a second attack which I could consider authentic.

Many physicians grant no distinction between measles and rubella, holding that they are forms of the same disease. Others make a false distinction by classing all mild attacks as rubella. Measles and rubella are distinct diseases, and although rubella is usually a much milder disease, some attacks are more severe than mild measles.

Rubella differs from measles as follows:

1. The incubation period is longer, being 14 to 21 days, averaging 17.
2. The period of invasion, or the prodromal

stage, is absent or short, usually being less than one day.

3. The eruption is smaller, more rounded, and more uniform, the spots averaging about 2-3 mm. in diameter. The eruption appears in the same places and order as measles but spreads downward and evolves much faster. The height of the eruption is usually reached on the first or second day and fading is complete by the end of the third day. No pigmentation follows.

4. There is more striking enlargement of the superficial lymph nodes, especially the post-auricular and post-cervicals, although usually all show enlargement. In rubella about 90% show

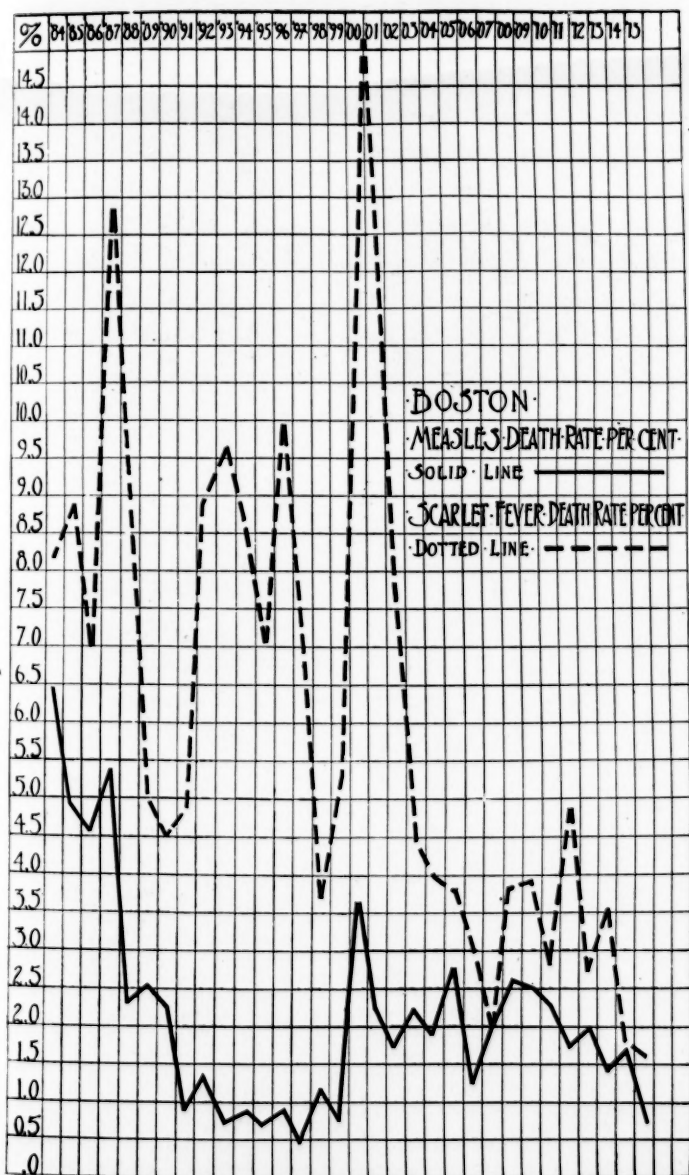


CHART III.

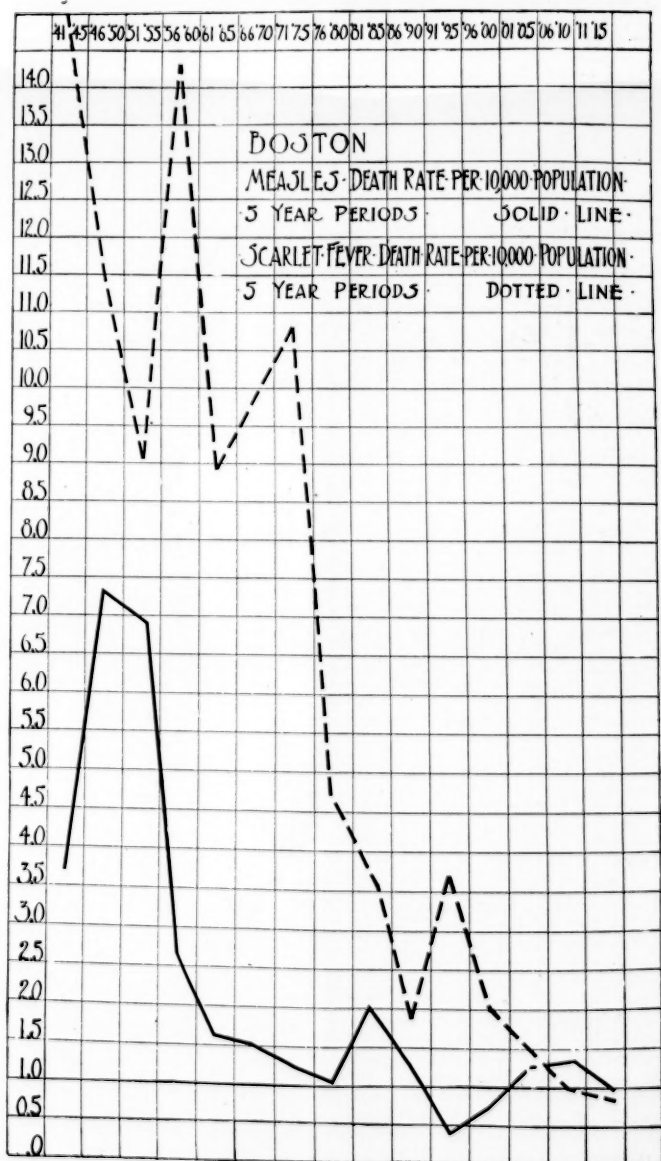


CHART IV.

post-auricular enlargement to less than 10% in measles.

5. No Koplik spots occur. Early in the course of rubella are often seen small maculopapules on the buccal mucous membranes and soft palate, but there are no granular specks such as distinguish Koplik spots.

6. Rubella is milder and has no complications.

So great is the variation in all these factors in both, however, that differentiation is sometimes excessively difficult and may be impossible. For proof, it may be necessary to depend on immunity evidence. Rubella confers no immunity to measles, and vice versa.

The methods of control which have been in use are isolation, with compulsory reporting, disinfection and quarantine especially as related to the schools.

The results obtained by these methods are practically nothing. There is no evidence that the incidence has been decreased, and there is no more probability of a child reaching adult life without contracting the disease now than generations ago. Very few escape except in very scantily settled communities whose communication with the world is slight. When the disease is introduced in such communities, such as the Faroe Islands, the epidemics are extensive and involve all ages. Most of the immunity in adult life is acquired.

There are several reasons for this failure in measles control. First, there is almost universal susceptibility. My records show that about 90% of young adults have had measles, the remaining 10% being chiefly persons who have forgotten or who have had unrecognized attacks, especially in infancy. Panum found no natural immunity in the Faroe Island epidemic he studied.

Second, measles is highly contagious for several days before the rash and before recognition, even in cases developing in general hospitals. No restrictions are placed, therefore, upon the patients during about half the contagious period. This first half is not only more contagious by far, but the patient does not feel sufficiently ill usually to give up his routine and freely exposes others. Isolation is, therefore, little effective even if many cases did not escape recognition altogether.

Even when diagnosis is made early by means of Koplik spots, communication of the disease to others in contact has usually occurred. Koplik spots, however, are of great value. Recently a nurse on duty in the diphtheria ward reported in the morning with catarrhal symptoms. She had Koplik spots and was isolated. Although the previous day she had been in contact with over 60 patients, many of whom had no history of having had measles, no cases developed. The nurse had a severe attack.

If isolation is to be of value at all, in measles control, it will require the general recognition

of the disease in the catarrhal stage by means of Koplik spots.

In order to see these spots it is essential to have a good light, preferably daylight, and to turn the mucous membrane of the cheek so that the light will reflect from it to the eye. When they are coalescent, the mucous membrane is covered with minute, pin-point, whitish, bluish white or nearly colorless granules, that do not wipe off. When discrete, they stand out more noticeably as whitish specks something like curdled milk, pinhead, or even larger, in size, and with a roseola. They may be few or countless. The appearance is often as though the buccal membrane had been dusted over with very fine white sugar or sand.

Koplik spots must be differentiated from bubbles, food deposits, and detritus, which easily wipe off, and from thrush, other stomatitides, thickening of the mucosa as plaques, and trauma from catching the mucous membrane slightly between the teeth or to rough teeth or tooth-roots. They are best seen on the buccal mucous membrane, but are also found on the palate, pillars, tonsils and nasal mucosa and possibly in the conjunctiva. They occur from one to six days before the rash, usually two to three, fading after two to three days as the rash becomes pronounced. They may fade before the rash appears or appear only as the rash comes out. I have never seen them absent in a true measles case seen throughout the disease, and believe they are as constant as the rash, *i.e.*, practically 100%.

Disinfection is without value in public health work. The virus dies so rapidly, that disinfection adds practically nothing to safety. Beside, the patient has usually already communicated the disease directly to all those likely to come in contact with his surroundings. I have never found evidence clinically of the virus surviving over six hours outside the body, and it usually dies much sooner. If persons who have not been exposed are to be brought in contact with material infected within less than six hours, disinfection may be of value but not otherwise.

Quarantine is of value if it can be applied thoroughly. In fact, it is our only recourse in the management of measles epidemics that is of value. Shut up the contacts or divide them up into small units until the disease burns out.

Schools play no small part in the dissemination of the disease and an epidemic in a school cannot be stopped, as a rule, while the school remains open, until it has exhausted the material. This is in contrast to scarlet fever and diphtheria.

There are many other manners of contact however, and closure of the school, unless home restrictions can be applied, is of very doubtful influence on the prevalence of the disease. To be effective, closure of the school must continue until no susceptible exposed children will return. In Liverpool, where school closure is a common

practice and thought to be of value, the general incidence and mortality does not seem to be altered.

The most that can be expected of these measures is to postpone the disease to a slightly later period of life. Even this is of value as the mortality is much greater, the younger the patient. Barthez and Sannée gave the following death rates by age:

	PER MILE
1 year.....	62.
2 ".....	53.1
3 ".....	34.4
4 ".....	30.3
5 ".....	24.9
6 ".....	17.5
7-15 years.....	9.6

Liverpool's rate for 1913 shows a similar variation.

The period of contagion is very short, less than two weeks and rarely over seven days. No carriers occur and the desquamation and discharges from nose and ear, etc., after the acute stage, are not contagious, although this is not generally appreciated. Measles is spread chiefly by direct contact and by droplet infection. Recently infected objects such as hands, handkerchiefs, dishes, etc., may spread the disease, but only for a few hours. Measles occurs spontaneously only in human beings and has no natural habitat outside human bodies. Domestic animals are not known to have measles. The virus is present in the blood during the early invasion stage, and just before, as shown by Hektoen and by Anderson and Goldberger. It leaves the body for transmission to others chiefly or solely in the discharges from the nose and throat, and possibly eye. Its point of entry is also the nose and throat.

As measles produces no carriers, it depends for its continuance on the ready transmission by discharges from nose and throat from person to person and on the high susceptibility to the disease. These characteristics explain the great fluctuation in the incidence, the periodic waves that sweep through communities.

With so little evidence of control of the disease and so slight hope under actual living conditions of really restricting the disease, what may be suggested as an outlet for our efforts against measles?

The mortality of measles is essentially the result of *bronchopneumonia*. Enteritis, mastoiditis, meningitis and septicemia, as well as sequelae such as tuberculosis, are occasional causes of death, but fully 90% of the deaths are due to pneumonia.

Chart v shows the percentage fatality of measles in Boston for the last five years arranged by wards. While no ward has solely good or solely bad hygienic conditions, it is evident that those sections of the city in which hygiene in the home is less good have the highest mortality. In contrast to this the diphtheria fatality for the same period shows no such suggestive relationship to general hygiene. The death rate of diphtheria is due largely to specific toxemia, and while greatly increased by ignorance and carelessness, it is not especially affected by hygiene *per se*. (Chart vi.)

Measures of management should thus be based on prevention and treatment of pneumonia, such as securing sunshine, fresh air, free fluids, rest in bed, regulated but sufficient diet, etc.

As a fact, on the contrary, the usual treatment, founded on custom and superstition, consists of dark rooms, stuffy atmosphere, many

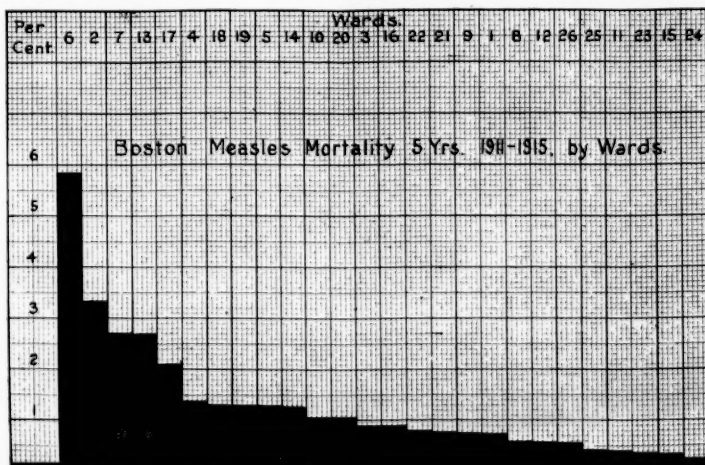


CHART V.

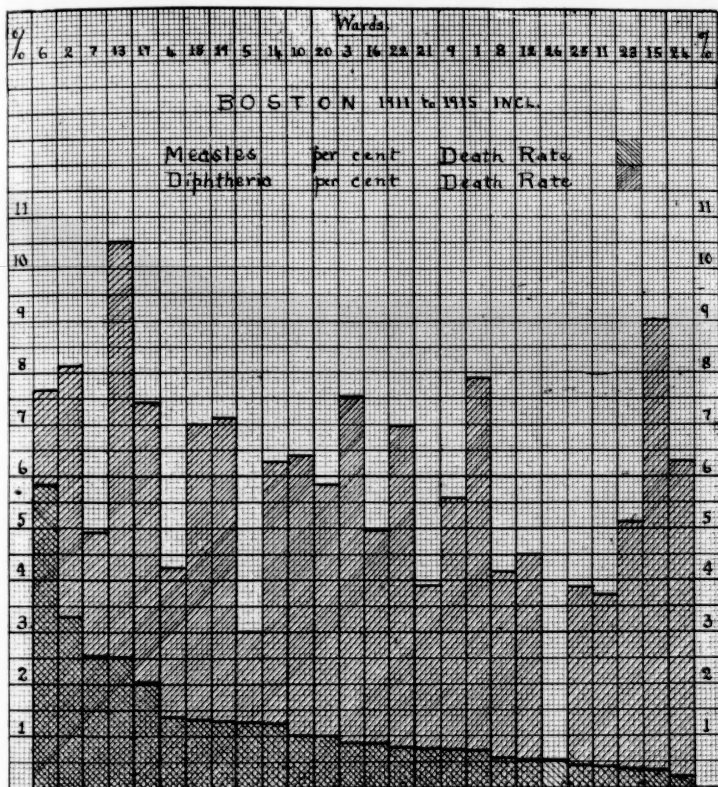


CHART VI.

blankets and hot drinks—all factors to reduce resistance and vasomotor tone.

The fear of the eyes which, for generations, has been emphasized by layman and physician alike, should be eradicated with the other superstitions. The only real danger of eye trouble is corneal ulcer which is fostered by uncleanness, trauma and poor hygiene, and the most valuable treatment is cleanliness and hygiene. As von Jurgenson says, we should not wait for the oculist to tell us of the value of light and hygiene. Photophobia is often absent and, when present, may be controlled by shading the eyes or with goggles while the patient has the advantage of fresh air and sunshine in his room.

The heat treatment and sweating for the purpose of keeping out the rash is a relic of barbarism and the result of false reasoning. It should have disappeared with universal blood-letting and purging.

The much dreaded "striking in" of the rash is not seen in patients treated under modern

hygienic conditions. Of course the rash does not "strike in." Simply the blood to the skin is withdrawn to the splanchnic area due to vasomotor paralysis, and the resulting blanching of the skin causes the rash to fade. The heat treatment, while of value at times in the presence of such shock, is of no value in forestalling it in these toxic states. In fact it is likely to reduce vasomotor tone.

Fresh air and draughts are sedulously avoided. In my opinion draughts do no harm, although chilling the patient so that the extremities become and remain cold is harmful whether from a draught or not. So long as patients are warm and comfortable, the out-door treatment is the best for measles.

Beside these attentions directed toward general resistance, the local resistance of the mucous membranes should be favored. Cleansing of the mouth, the use of oily protective sprays, plain or with camphor and thymol and eucalyptol for the nose if obstructed, and the free intake of

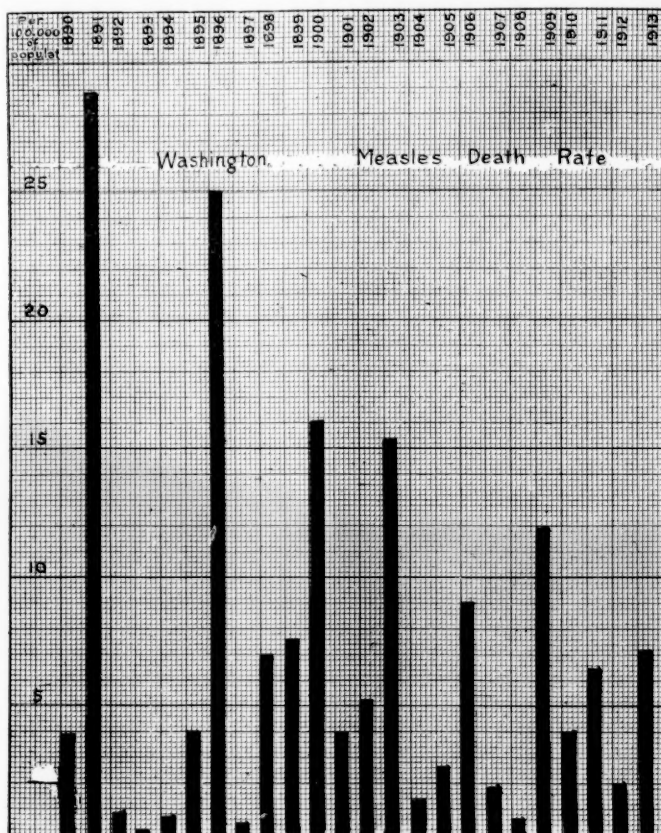


CHART VII.

water, may all have some bearing on mucous membrane infection. It is doubtful if inhalations of any kind are of great value in the local resistance of the mucous membrane of the lungs, but they may be of value for infections of the larynx and trachea. Relief from the harrowing cough is essential, and expectorants (of which water is the essential) and codeine are often necessary to favor sleep and avoid local trauma from constant coughing.

Protection of measles patients from other infections like the common colds and diphtheria is especially important. It is probable that the organisms producing pneumonia are usually present on the mucosa in measles and are not imported from other patients who are already ill with pulmonary complications. E. W. Goodall reported that of 220 consecutive cases of measles admitted to the Eastern Hospital, Lon-

don, 19.5% had pneumonia on admission; while of 177 cases admitted, without complications, only 6.3% developed pneumonia. I have failed also to find any definite connection between the cases developing pneumonia after admission and cases which already had pulmonary infection. It is worth while, however, avoiding even the risk.

These measures will not eradicate, of course, the death rate of measles or pneumonia. The general condition of the patient, his vitality and nutrition, as well as absence or presence of other diseases, are important factors in the mortality when measles develops. In good homes and in healthy children in good hygienic surroundings the mortality is very low; while in weak and ill children it is very high.

Comby gives the following figures for hospital and asylum cases:

Hospice des Enfants Assistés:

5 years 1575 cases 728 deaths 46.22%

Hôpital des Enfants Malades:

7 years 2585 cases 1045 deaths 40.15%

Hôpital Trousseau:

5 years 907 cases 227 deaths 25.02%

In contrast to these are the figures of the Newton Board of Health.

NEWTON.

Year.	Cases.	Deaths.	Per Cent.
1908.....	489	0	0.00
1909.....	428	3	0.70
1910.....	236	0	0.00
1911.....	368	4	1.08
1912.....	774	0	0.00
1913.....	280	0	0.00
1914.....	388	1	0.25
1915.....	293	1	0.34

MEASLES CASES AND DEATHS AND PER CENT. OF CASE FATALITY, BOSTON.

ARRANGED BY WARDS.

Ward.	Cases.	Deaths.	%	Ward.	Cases.	Deaths.	%
1	820	6	0.72	14	933	12	1.28
2	1116	37	3.31	15	591	2	0.33
3	448	4	0.89	16	779	7	0.89
4	426	6	1.37	17	764	16	2.09
5	223	3	1.29	18	684	9	1.31
6	1743	102	5.85	19	920	12	1.30
7	545	14	2.57	20	2488	26	1.04
8	1563	9	0.57	21	1014	8	0.78
9	1062	8	0.75	22	1004	8	0.79
10	573	6	1.05	23	868	3	0.34
11	728	3	0.40	24	1761	4	0.22
12	884	5	0.56	25	1190	5	0.42
13	662	17	2.56	26	358	2	0.56

DIPHTHERIA CASES AND DEATHS, BOSTON, 1911 TO 1915 INCLUSIVE.

ARRANGED BY WARDS.

Ward.	Cases.	Deaths.	%	Ward.	Cases.	Deaths.	%
1	519	41	7.90	14	316	20	6.32
2	675	55	8.14	15	344	22	9.01
3	226	17	7.52	16	383	19	4.96
4	187	8	4.27	17	456	34	7.45
5	198	6	3.03	18	299	21	7.02
6	1005	77	7.66	19	558	40	7.16
7	161	8	4.96	20	922	54	5.85
8	884	37	4.18	21	485	19	3.91
9	321	18	5.60	22	415	29	6.99
10	156	10	6.41	23	390	20	5.13
11	215	8	3.72	24	467	22	6.00
12	485	22	4.53	25	335	13	3.88
13	342	36	10.52				

LIVERPOOL.

DEATH RATE OF MEASLES.

Year.	Per 100,000 Population.	Per 100 Cases.
1901.....	472
1902.....	330	4.67
1903.....	132	4.84
1904.....	693	7.36
1905.....	245	6.27
1906.....	570	8.59
1907.....	290	5.15
1908.....	258	5.56
1909.....	470	7.41
1910.....	472	9.96
1911.....	308	6.92
1912.....	875	10.85
1913.....	322	7.72

I believe that a definite decrease in mortality may be secured by the application more generally of the principles of hygiene to patients who become ill with measles. Occurring in each generation, the disease is especially subject to the handing down of home ideas of treatment. It is for the medical profession to substitute for the irrational and often harmful ideas of management a sensible, rational and scientific handling of measles.

III.

THE ETIOLOGY OF SCARLET FEVER.

By F. B. MALLORY, M.D., BOSTON.

THE primary lesion of scarlet fever is located in the respiratory tract, starting usually in or around the tonsils. In severe cases it may extend to the naso-pharynx, to the larynx, trachea and bronchi, or to the esophagus. The lesion consists of necrosis and inflammation. It may affect only the surface epithelium, but often invades also the underlying tissues. The exudation consists of serum and polymorphonuclear leucocytes. Fibrin may be absent or formed in moderate amount. The lesions may appear from the beginning as erosions or as membrane-formations. In the pharynx erosions are often visible even in mild cases. In severe infections membrane formation may occur in the larynx, trachea, and bronchi, but it is rarely or never so dense or adherent as in diphtheria.

Study of the lesions of scarlet fever shows the presence in them of a delicate gram-positive bacillus in large numbers. A brief statement of what Dr. E. M. Medlar and I have found up to the present time is appended; also three plates of illustrations. The subject was presented to the Society in the form of a lantern-slide demonstration, but a connected account of our findings seems more proper for publication.

Microscopic examination of the tissues from a child dying from scarlet fever on the second day following the appearance of the skin eruption shows large and small masses of gram-positive bacilli in some of the crypts of the tonsils. The bacilli lie in the upper portion of the fibrino-purulent exudation covering the walls of the crypts, from which the lining epithelium has disappeared. Streptococci are fairly numerous all through the exudation, occasionally in the underlying tissues, and also abundantly in the free pus present in the lumina of the crypts.

Clumps of similar bacilli occur in the exudation on the surface of the tonsils. In addition, masses of these bacilli are present in practically pure culture in slight depressions and erosions in the squamous epithelium covering the tonsils, the pillars of the fauces, the soft palate, includ-



PLATE I. FIG. 1.—Trachea (10.20); moderate membrane formation with masses of bacilli in the upper portion of it. X200.

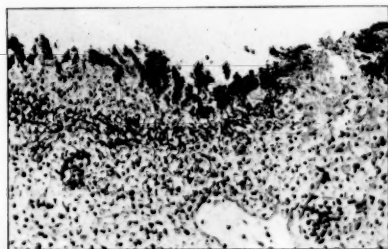


FIG. 2.—Pharynx (05.100); masses of bacilli on surface of lesion. X200.

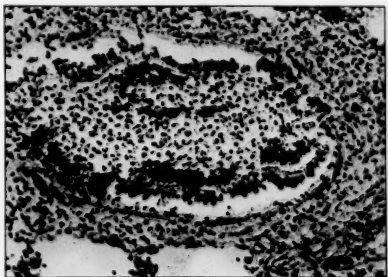


PLATE II. FIG. 3.—Bronchiole (10.20); clumps of bacilli along epithelial surface; exudation of serum and polymorphonuclear leucocytes. X200.

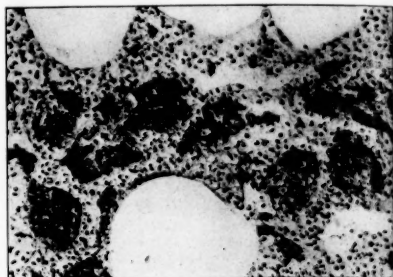


FIG. 4.—Lung (10.20); masses of bacilli in alveolar spaces; exudation of serum, polymorphonuclear leucocytes, and a little fibrin. X200.

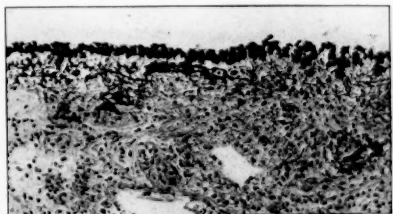


PLATE III. FIG. 5.—Larynx (05.100); masses of bacilli along the surface of a thin membrane. X200.

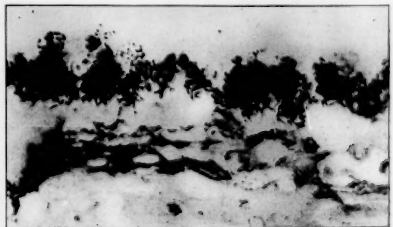


FIG. 6.—Same as Fig. 5. X1000.

ing the uvula, and the root of the tongue. The bacilli grow in between the epithelial cells, killing them and causing an exudation of polymorphonuclear leucocytes. Little or no fibrin is found.

In the trachea the epithelium has disappeared. The surface in places is covered with a thin layer of fibrin and leucocytes. Along the surface and in the upper part of this exudation are masses of bacilli similar to those present in the epithelial covering of the soft palate. Where the exudation has been detached from the wall,

the bare basement membrane shows the same bacilli scattered along it in small numbers.

In the lung is a well-marked broncho-pneumonia due to masses of bacilli like those in the trachea, and occurring apparently in pure culture. Some of the bronchioles and alveoli are completely filled with the organisms. The inflammatory exudation consists almost entirely of serum and polymorphonuclear leucocytes. But little fibrin has been formed.

In a second early case the tonsils show considerable necrosis and ulceration. In the exudation are many streptococci. Along the surface of the exudation in the crypts are small masses of organisms which stain irregularly and are evidently disintegrating. Their exact structure cannot be determined. On the surface of

the pharynx and larynx are lesions similar to those in the first case, but more extensive. In places the organisms form a continuous layer. More fibrin is present in the exudation, and occasional clumps of cocci are found.

Smears made from swabs thrust deeply into the crypts of the tonsils in three early cases of scarlet fever (from ten to forty-eight hours after the appearance of the eruption) showed small and occasionally large masses of gram-positive bacilli similar to those described above in the lesions found at post-mortem examination. In two patients without tonsils, smears made from the pillars of the fauces and from the soft palate showed similar bacilli in small clumps. Curettings of erosions on the soft palate of one of these patients showed masses of the same bacilli. In smears made only from the surface of the tonsils of two cases the findings are doubtful.

Cultures of a bacillus resembling morphologically and in staining reactions that found in the post-mortem tissues, and in the smears from the tonsils and soft palate, have been obtained in five instances, four times from the crypts of the tonsils and once, when the tonsils were absent, from the soft palate.

The organism is a strongly gram-positive bacillus (decidedly more so than the diphtheria bacillus). It stains well with ordinary dyes and shows a tendency to irregularity of staining in lightly stained preparations. This irregularity of stain is also noted in too strongly decolorized gram preparations. No polar bodies are present.

In culture the bacillus is slightly smaller than the diphtheria bacillus, and varies from coccus-like to large bacillary forms. The average-sized bacillus is 1 to 3 micra in length by .5 to .7 micron in diameter. It is broadest in the middle and tapers slightly toward the ends, which are rounded. Ordinarily in smears from growth on solid media the bacilli are in masses arranged similarly to diphtheria bacilli. Pairs and short chains of bacilli are common, while occasionally, and more constantly in the water of condensation, long chains are found.

The bacilli in tissues and in direct smears from scarlet fever cases are slightly larger than the organisms in culture, but otherwise resemble them. In some instances there is a greater tendency toward irregularity of stain than in cultures.

The organisms isolated are facultative aerobes. They grow best anaerobically upon serum-glycerin (3%)-dextrose (.5%)-agar. Less abundant growth upon other media occurs.

The colonies attain the size of .5 to 1 millimeter in diameter in twenty-four hours at 37° C., and after that do not greatly enlarge. By direct illumination they are opalescent with an opaque refractive center more noticeable in the larger and older colonies. Upon micro-

scopic examination they are finely granular. Their edge is entire or slightly undulate.

It seems reasonable to infer from these observations that scarlet fever may be due to a strongly gram-positive bacillus (*B. scarlatinae*) which is less virulent than the diphtheria bacillus, but which infects practically the same localities, and in severe cases may extend in the same way to adjoining tissues, especially the larynx, trachea, and lungs. The toxin causes necrosis and desquamation of the covering epithelium and leads to an exudation of serum and polymorphonuclear leucocytes. Fibrin formation is usually absent or slight. On this account the primary gross lesions are inconspicuous and easily overlooked. There is usually little membrane formation to call attention, as in diphtheria, to the lesions.

The bacillus of scarlet fever usually dies off quickly in the lesions, so that after the second or third day following the eruption, it is often difficult or impossible to demonstrate it, but it opens the way for streptococcus invasion and seems to favor its growth.

IV.

SCARLET FEVER.*

By CHARLES V. CHAPIN, M.D., PROVIDENCE, R. I.

THE attempt to control an infectious disease may do two things. It may reduce the incidence of the disease, as has been so signally accomplished in yellow fever, typhoid fever and malaria; or it may reduce the case fatality, as has been done by the use of sera in diphtheria and cerebrospinal meningitis.

Although there is at times much difficulty in interpreting vital statistics, yet it is necessary to make an ultimate appeal to statistics to determine whether measures of control are effective. The mortality figures for scarlet fever are most encouraging. Thus in Boston the mortality from this disease in the five years 1855-59 was 142 per 100,000 living, while in the five years 1906-1910 it was only 9. In Providence it fell from 124 in the decade 1856-1865 to 15 in the decade 1906-15. A similar reduction is noted in many other American and European cities, particularly in England. To what is it due? Unlike the reduction in diphtheria mortality, it is probably not due to better treatment. It may be due, wholly or in part, to a diminished virulence. It is well-known that scarlet fever varies greatly in this respect. Has there been a change in Boston or Providence during the last sixty or seventy years sufficient to account for the lessened mortality? This is not easy to determine. During the thirty-two years during which there has been notification of cases in Providence, the apparent case fatality has varied considerably. It was decidedly high during the first few years, ranging from

* Read by title.

about 10 to 22%. That this was, to a considerable extent, due to defective notification is almost certain, as was the high case fatality of typhoid fever and diphtheria at the same time. The memory of physicians over such long periods is not trustworthy. The only other criterion of virulence suggested is the index of plural deaths. The frequency with which more than one death occurs in a family ought to indicate the virulence of a disease. At considerable labor I had worked out the ratio of plural deaths in scarlet fever for a number of years, and found, where the case fatality was known to be high the number of plural deaths was high. Selecting ten years with an average case fatality of 2.62 the ratio of plural deaths was 5.3, while in ten years, with an average case fatality of 8.5, the ratio of plural deaths was 11.2. In 1906-7 a much more severe type of scarlet fever appeared, with a case fatality of 12%. The ratio of plural deaths to total deaths in these two years was 12. It would thus appear that the ratio of plural deaths is a rough indication of the severity of the disease. Turning now to the first decade of death registration, 1856-1865, it is found that the average ratio of plural deaths was about 9, or nearly twice as great as in the years when the case fatality was 2.6. It seems highly probable that half a century ago the disease was at least three or four times as virulent as at the present time, but as the deaths were from ten to fifteen times as numerous it is a fair inference that the disease is not only milder, but far less prevalent today than it was fifty years ago. This diminished prevalence is probably due in part to isolation and is partly because a severe type of the disease is apparently more infectious than a mild type. On the whole, it may be inferred that isolation has to a considerable extent diminished the incidence of the disease, but that a decreased virulence is also largely responsible for the greatly lowered death rate. Another indication of the effect of isolation is seen in the curve of scarlet fever mortality. In many cities, before isolation was enforced, the disease occurred in sharp outbreaks, four or five years apart, much as measles occur now, though at slightly longer intervals than measles. After notification and isolation the curve flattens out and the epidemic peaks are much lower, thus indicating a real control of the disease.

It is stated by English observers that the age of attack has been postponed, which is desirable in itself, as the fatality is far less after the second year, and also indicates that restrictive measures have really reduced the incidence of the disease.

I am also inclined to think that isolation has been an important factor in reducing the severity of the disease. If a disease tends at all to breed true, that is, if severe cases follow severe and mild follow mild, isolation, as generally

carried out, must lower the virulence. The severe cases are sure to be recognized and are isolated, so that they have less chance of perpetuating their strain than have the mild cases, which so often fail of recognition. Scarlet fever does breed true to some extent, for we find a mild type often prevailing for years in a locality. On the other hand, although the mild type quite generally prevails at the present time, more or less severe outbreaks occur. Thus in Providence for about four or five months in 1906-7 there was such an outbreak, with a case fatality of 16 or more. Similar outbreaks are from time to time noted elsewhere, and the type is carried from one community to another. At present these outbreaks are not very numerous, and they seem usually to be checked, as one would naturally expect that they would be. A similar phenomenon is noted in smallpox, a very mild type of which has persisted for about twenty years. The severe type has been introduced from abroad many times, but has always been stamped out, often very promptly. If this theory is correct, isolation accomplishes as much, and perhaps more, by decreasing the severity of the disease, as it does by decreasing its prevalence.

The great reduction in the mortality in Boston began in 1877, two years after systematic isolation was inaugurated, and in Providence in 1889, three years after isolation was inaugurated. So also the marked decrease in the number of deaths in English cities is, in a way, coincident with the application of methods of isolation. It is to be noted that, while there has been some irregular diminution in the death rate of late years, it has not been nearly as marked as it was at the beginning of public health activities against the disease. Thus in Providence during the last twenty years the rates for the five-year periods have been 9, 11, 21 and 9. In Boston they were 20, 15, 10 and 9. In all the registration cities of the United States the rate fell from 12.8 in the five years 1900-1905 to about 11.9 for the five years 1909-13. The retardation in the decrease has taken place in the face of a slowly-improving notification, better isolation and increasing hospitalization.

The most effective means of isolating a case of contagious disease is to put it in a hospital. This view induced the English to attempt to stamp out this disease, or reduce it to a minimum, by the hospitalization of as many cases as possible. This began to be urged thirty-five or forty years ago, when the high mortality of the disease was a serious menace. Many large hospitals were built, and in a number of cities the hospitalization of a large proportion of reported cases has been accomplished, but with very disappointing results. The disease is far from exterminated. There are more cases in London than in New York, more in Liverpool than in Boston, more in Leicester than in Provi-

dence, though hospitalization is far less complete in the American cities.

It thus appears that the control of scarlet fever by the usual methods of home isolation and hospitalization is disappointing. The disease is still very prevalent and, while decreasing, the decrease is not rapid. In England, where in many cities 90% of the cases are removed to a hospital, they are questioning the wisdom of such an expensive method of isolation, which has so little influence on the prevalence of the disease.

In this country health officers for the most part thoughtlessly follow routine methods of control and hope, by urging better reporting by physicians, and perhaps more stringent isolation, further to reduce the disease. It is generally agreed that the chief reason for the failure of isolation is the existence of so many missed cases and carriers. Many believe that the former are more common and much more important than the latter. It is alleged that to control the disease it is necessary for the health officer to go out and search for the mild cases, which either have not been seen by a physician, or have not been recognized by him. Dr. Hill, former epidemiologist of the Minnesota State Board of Health, and Dr. Chesley, his successor, have been most successful in developing this investigation of sources of infection. In a recent article, Dr. Chesley¹ has given an excellent description of the control of an outbreak in a town of some 5000 inhabitants, in which there had been many mild cases, which were generally believed by the physicians, as well as by the laity, to be German measles. Every child in school was carefully examined, all absentees looked up, all reported cases investigated, and all with whom they had been in contact during the period of incubation, sought for and examined. All susceptibles who had been in contact with the sick were kept under observation. The examination of all school children and of all who are sick at home, and the working out from every frank case which can be discovered, both to find missed sources, and to prevent danger of cases developing in contacts, are the essentials. Dr. Chesley does not favor too strict isolation of the cases and deprecates unnecessary hardships for well wage-earners as tending to encourage concealment. It is stated that many scores of outbreaks of scarlet fever in Minnesota have been cut short by these methods. Doubtless such an intensive search for missed cases is best suited to small communities, especially those with a homogeneous and English-speaking population. Doubtless, also, it is easier for some one with authority from outside, like a state health officer, to step in and take charge, than it is for the local health official to undertake such work. Nevertheless, there is no doubt that more intensive work of this kind in ferreting out sources of infection, especially

in the beginning of an outbreak and in small communities, would very materially reduce the prevalence of scarlet fever in such communities.

Even in the large cities probably something more might be done by a more diligent search for missed cases, but it can scarcely be hoped to lower materially the incidence of the disease in this way. Imagine how futile it would be, in a crowded Polish or Italian quarter of Boston or Providence, to attempt to find and follow up all the persons with whom a seven-year-old boy had come in contact during the preceding week. It is to be feared that the disease cannot materially be lowered in this way.

Though striking results may not be obtained in every community by isolation, yet, even ordinary routine methods of control have great value. By them the virulence of the disease is lowered, its prevalence is kept down and slowly diminished, and if abandoned there would probably soon be a reversion to conditions of fifty years ago. What we should strive for is the isolation of more cases, not more isolation of the cases. To determine the essentials of isolation, reference must be had to what is known about the mode of infection. This knowledge is considerable in view of the fact that nothing has hitherto been known of the causative organisms of the disease.

The incubation period is variable. Most cases develop within three or four days, though a few may be delayed for two, or perhaps three, weeks. A week is a very practical period for the supervision of contacts.

Scarlet fever is certainly infectious as soon as the first throat symptoms appear. The infectivity is at its height during the first days of the disease. In uncomplicated mild cases it soon begins to diminish. Many think that a large proportion of mild cases of scarlet fever are free from infection by the end of the third week; doubtless, at times, even earlier. Unfortunately in many cases the infectivity is greatly prolonged. The experience of the London hospitals shows that five, or six, per cent. of the cases are infectious for over six weeks. A few cases remain infectious for months. There seems to be a correlation between the complications and the duration of infectivity.

The infective material is certainly found in the throat secretions. The pathological condition also extends to the nose, as in diphtheria, giving rise to a nasal discharge, which is also infectious, as in the latter disease. So also is the aural discharge, but this is not so important. Nothing is known about the infectivity of the urine. There is a large amount of evidence that the exfoliated epidermis is not infectious. This can safely be disregarded in the release of patients. Patients should be isolated as long as there is any inflammation of the throat, any nasal, or aural, discharge. The latter may, however, at times be disregarded, especially if the ear is to receive proper treatment. The re-

¹ Chesley: *Am. Jour. Pub. Health*, 1916, vi, 234.

removal of tonsils and adenoids, if the operation is indicated, is believed by many to shorten the period of infectivity. After every precaution is taken, it will be found that a certain number of cases, apparently entirely normal, are yet infectious, that is, they are true convalescent carriers. For a mild, uncomplicated type of the disease, probably four weeks is a reasonable period of isolation. When the disease is more virulent, and there are many cases with complications, it is doubtless safer to prolong it a week or two.

The disease frequently presents a very mild type. There are numerous cases with a slight sore throat, a very fleeting eruption and scarcely any fever. Sometimes there is no eruption. There are doubtless true carriers, that is, persons infected but presenting no symptoms whatever; but our knowledge of these is limited. There is evidence that the number of mild, unrecognized cases is large, perhaps equal in number to the reported cases.

Scarlet fever is not especially contagious. It is less so than measles, whooping cough, chicken pox, or smallpox. It is spread almost exclusively by contact with the fresh secretions of the throat and nose. It is rarely, if ever, airborne. Infection by fomites, as the term is ordinarily understood, is negligible. Infection almost never passes from one family to another in the same dwelling unless the families mingle.

Isolation of the case in the family is not very difficult. Too much should not be attempted. The most important matters only should be insisted on, otherwise complexity of detail will result in neglect. The patient, of course, must be kept in one room. One person only should act as nurse. A wrapper, which is kept in the room, is to be worn if much is to be done about the patient. On leaving the patient, the hands must always be washed in hot soap and water and well rinsed, preferably in running water. As few dishes as possible should be used, and these should be scalded and washed by themselves. Soiled linen should be placed in a wash-boiler or dishpan kept in the room, and should afterwards be boiled. It is preferable to have these procedures demonstrated by a nurse. It seems likely that frequent visits by a nurse during the course of the disease is the most effective means of securing proper care of the case and enforcement of rules. It is better than visits by doctors, or policemen, though the latter are sometimes needed.

Children in the family should not go to school. Those who are susceptible should be well isolated for a week. Later they may be allowed more freedom. Adults should not be seriously restricted. Milkmen and other food handlers should move away, also those who come much in contact with children. Laborers, mechanics, clerks, and indeed most wage-earners, need not be kept from their occupation.

The most expensive means of isolation is the

hospital, yet it is a necessity. There are a considerable number of persons who are so ignorant or careless, or who live under such bad conditions, that reasonable isolation at home cannot be secured. While the proportion of wage-earners who should be kept from work is not large, keepers of small stores connected with the house, peddlers of fruit, candy and ice cream, messengers and others, are apt to live so that home isolation is not practicable, and their loss of occupation would be a serious economic disaster. It is by no means necessary to attempt to provide hospital accommodations for from 90 to 95% of the cases, as is done in England. Probably if 40 or 50% of the cases most needing it, could be removed to a hospital, the full value of the latter would be secured.

V.

REPORT ON THE FATAL CASES OF DIPHTHERIA OCCURRING IN THE CONNECTICUT VALLEY HEALTH DISTRICT IN MASSACHUSETTS DURING 1914.

By JOHN S. HITCHCOCK, M.D., NORTHAMPTON, MASS.

DURING this past winter and spring the State District Health Officers of Massachusetts have been looking up the 1914 fatalities from diphtheria. The mortality from this disease was relatively high and there had been no material decline in it for several years prior to 1915, therefore it seemed well worth while to have the details concerning it on file. Because of the lapse of time and movements of people, this must be permanently incomplete, but we have learned some valuable facts. This paper is a preliminary report of this survey and covers only the facts learned by me in the Connecticut Valley District.

This District includes 1156 square miles, and contains 334,700 inhabitants, 213,684 of whom live in the four cities and 121,016 in the forty-three towns. The physical conditions vary from hill towns with a large acreage per person, to cities with densely congested districts; sanitary conditions, from crowded, filthy cabins in the country and tenement-house life in the cities, to the finest of country estates and the most modern of city houses; the character of the population, from the super-educated person of means and leisure, to the dull, non-English-speaking, recent immigrant.

From this District, in 1914, there were reported 598 cases of diphtheria, with 73 deaths, a case mortality of 12.2%. During this same year the case mortality of the State at large was 8.07%, and of the United States Registration Area 10.96%. These cases were located in the towns and cities along the river bottoms; none of the high hill towns reported a case, although three of them sent in specimens for examination.

Postal communication between many parts of

this District and Boston depends for promptness on catching certain mail trains, and renders the general use of the State Laboratory for diagnostic purposes unsatisfactory. There are several private and municipal laboratories that serve the section well. During 1914 the following diagnostic examinations were made:

By the State laboratory 192
By municipal and private laboratories 2064

2256

A total of 3.78 times as many specimens as there were positive cases reported.

This examination of more than ten times as many specimens by local laboratories as were examined by the State Department laboratory is a clear showing of the inconvenience of the latter for use by the people in the western part of the State, and is a strong argument for the establishment of a branch of that laboratory in that section.

Among the poorer people here, just as elsewhere, a doctor's fee is not a light matter, while a sore throat in some member of the family is a common, almost constant, visitor, and one to whom home remedies are applied too confidently. As a consequence we find that among these 73 cases the doctor was called on the first day in 15, on the second day in 12, on the third day in 7; total during the first three days of 34, or 46.5% of cases, leaving 39 cases, or 53.5%, in which he was not called until the fourth day or later. Twenty-seven of the 73 cases, or 36.9%, died on or before the fifth day of the disease. This shows how often the doctor had only one day to work in.

Since diphtheria antitoxin is our standard remedy for the disease, we are interested in the record of its use here.

52 cases, antitoxin was given and the amount recorded.

5 cases, antitoxin given, amount not recorded.

15 cases, no antitoxin given.

1 case, no facts learned.

In the 52 cases where details were recorded,

Total amount given.....	781,500 units
Average amount given.....	15,000 "
Largest total to one case.....	150,000 "
Smallest total to one case.....	1,500 "
Average initial dose.....	6,800 "
Largest initial dose.....	50,000 "
Smallest initial dose.....	1,000 "

Perhaps the most striking fact brought out by these records is, that, while the average amount used was 15,000 units and the average initial dose 6800 units, 26 cases, or 35%, received a total of 6000 units or less; and 23 cases, or 31%, received an initial dose of 3000 units or less, and the majority of these 73 cases were obviously in a serious condition when first seen.

Antitoxin was not given in 15 cases because

2 cases were dead when the doctor arrived.

2 cases died while antitoxin was being procured.

7 cases were moribund and the doctor thought it useless.

4 cases the family refused to allow its use.

If diphtheria cases were met with more frequently in general practice all physicians would carry a supply of antitoxin in their medicine cases; having to procure it not only delays its administration, but focuses the attention of the family on the procedure. They believe it must be an extraordinarily powerful and little used remedy, hence dangerous to the child, and opposition to its use is at once stirred up, especially among ignorant people. If, after its use, in spite of opposition, the child dies, the family is unshakably convinced that the death was due to the remedy, not to the disease.

TYPE OF THE DISEASE.

Pharyngeal only..... 32 cases, 43.7%
Laryngeal, or with larynx involved. 41 cases, 56.3%

Of the laryngeal cases,

7 were intubated.

1 was tracheotomized.

4 died while being intubated.

1 intubation was refused.

DEFINITE CAUSES OF DEATH.

47 (64.5%)—Toxemia.

11 (15.0%)—Heart complications.

(7 myocarditis after apparent improvement.)

(4 sudden heart failure on exertion.)

7 (9.5%)—Suffocation.

3 —Sepsis from co-existent infection.

2 —General paralysis after six weeks.

1 —Bronchopneumonia (after expulsion of tube).

1 —Nasal hemorrhage (uncontrollable).

1 —No record obtainable.

73

The record of the seven cases in which no antitoxin was given because the doctor in charge thought it was too late to be of any use, together with the statements made by physicians during the course of this survey, has compelled the writer to believe that many of us hesitate to use antitoxin to the best advantage because we have not a clear knowledge of its nature and action.

When I studied medicine, diphtheria antitoxin was unknown. When it was first introduced the common belief was that its action was directly bactericidal. That first-learned impression stays in the front of my mind despite the fact that I know better, and it requires a definite mental effort for me to retire this impression behind the facts as we now see them. The same is evidently true of many of my confrères. Therefore, for the benefit of the older men, and at the risk of being tedious to the younger men, I propose to rehearse again the nature of this "antitoxin" and how it works.

To begin with, it has no direct bactericidal action whatever on the bacilli. It does two things: It neutralizes the poisons, the toxins, that the bacilli produce, and it takes away from the bacilli some of their unusually effective power to resist the attacks of our phagocytic cells. It neutralizes these poisons very much as an alkali neutralizes an acid, much as alcohol stops the corrosive action of carbolic, and like them, it does not repair any damage that may have already been done. It reduces the power of resistance to phagocytes very much as taking away the kick from a mule would reduce his power of resisting his enemies.

The antitoxic elements in the product we call "antitoxin" have no direct effects that are dangerous to human life. There is, however, a very real, though not a common danger in the use of this product, "antitoxin," which depends on the blood serum that is in it. The introduction of foreign protein into the blood of certain susceptible individuals may cause an explosion of sudden, alarming, even fatal symptoms. This series of symptoms is known as "anaphylaxis." I use the term with fear and trembling, it is so vague and varied in its meanings as used by different men. It seems sufficient for me to know in connection with diphtheria antitoxin that, in persons who suffer from "horse asthma" or "horse hay fever," that is, asthma or hay fever which is brought on by the smell of a horse, a dose of antitoxin may be immediately followed by sudden death, and, that in certain other persons with similar tendencies who have received one dose without showing any bad results, if a sufficient amount of time is allowed to elapse, the administration of a second dose, even a small one, may be followed by the same fatal symptoms.

Aside from these two rare conditions,—really phases of the same condition,—the use of antitoxin, even in large doses, is absolutely without danger to the life of the individual. Eczemas and urticarias are fairly frequently caused by it, but these, while at times distressing, are trivial effects when compared with the life-saving properties of the remedy.

The first of the phases of this actual danger may be guarded against by questioning the parents or friends as to the presence of this "horse asthma." If the patient is a sufferer from it, has a mild attack of diphtheria and you can probably carry it through along old lines of treatment, do so. If the case is severe and you need antitoxin, inject four or five drops and watch for an hour. If no untoward symptoms develop in that time, you can go ahead with the full dose in safety.

The second phase of actual danger is to be met by giving a sufficiently large initial dose to avoid having to repeat it.

In order to neutralize the poison of the bacilli the antitoxin must get into contact with it. If given subcutaneously, it is rather slowly

absorbed and its good effects do not appear for some hours. If the condition of the patient calls for quick action, it should be given intravenously. By this method neutralization of the toxins is accomplished far more quickly and with a much smaller dose of antitoxin than if the subcutaneous injection is used. Take those seven cases in the list reported in which the remedy was not given because the doctors thought them too far gone to be helped—it is well within the bounds of probability that some of them might have been saved by the intravenous use of the remedy. No patient while still alive is too far gone to be beyond the possibility of help from an intravenous dose.

An incident connected with this inquiry illustrates this as well as other points. A physician, when asked what killed a certain patient, said that he did, because he did not insist on the use of antitoxin before a positive laboratory report could be obtained. By reason of overgrowth, this was not secured for five days. The family then withdrew their prohibition and the antitoxin was given but without success. Within two weeks after my visit he was called as a consultant in a moribund case. In telling me about it later, he stated that, except for our previous talk, he would have agreed that it was of no use to do anything for this child, but that, since he did not care to tell me again that he had not done everything possible, he put 20,000 units into a vein and the child recovered. That very large dose neutralized the poison effectively and just in time.

Another point brought out is that the doctor assumed the responsibility of the death of the first child on the ground that he had lost time while waiting for the laboratory findings. As a matter of fact, he had taken two specimens daily in order to confirm his clinical diagnosis as soon as possible.

Another point brought out is that he had the courage to use the large dose of 20,000 units intravenously in this dire emergency.

The moral of all this is: Use antitoxin early and freely without waiting for confirmation of your clinical diagnosis even if it be only a tentative one. I agree heartily with the Boston Board of Health which suggests that any case that is clinically suspicious enough to warrant taking a culture for diagnosis is suspicious enough to receive antitoxin without waiting to hear from that culture. Time counts for so much in the efficacy of treatment for diphtheria that not a moment should be lost through indecision. In this series of 73 cases, the doctor's first visit was not made until the fourth day or later in 39, or 53.5% of the cases, while 27 cases, or 36.9% died on or before the fifth day. It seems fair to assume that the intravenous administration of antitoxin in large doses when these critical cases were first seen would probably have saved a number of these lives. Toxaemia was the cause of death in 64.5% of all these cases

and toxæmia is the very condition that antitoxin most surely controls. The degree of control will depend on the amount used and on the time and method of its administration as adjusted to the needs of the individual case.

The important factor of delay in calling the doctor is closely connected with the financial standing of the families, 91.8% of these deaths occurring in families in poor circumstances. The doctor's fee is no small item to them and he is not called for a sore throat unless it is a pretty bad one, consequently, sore throats treated by home remedies are so common that often neither the patient nor the mother connects a sore throat with other manifestations for which a doctor may be called in. In my opinion a doctor who fails to inspect the throat of every child under five years whom he is called to visit for any purpose or symptom is coming close to malpractice. No matter what the illness, the throat should be examined as a matter of routine. Many an unsuspected diphtheria has been unearthed in this way.

Heart complications rank second in our causes of death, being responsible for 15%. Of the 11 heart cases, seven died from myocarditis which appeared after the acute symptoms were over and convalescence was apparently established. In four of these seven the myocardial symptoms followed grave, unauthorized errors in diet, with resultant diarrhea and vomiting. Four of the heart cases died of sudden heart failure following muscular exertion; for example, one of them sat up quickly in bed to say "Hello!" to the nurse and dropped back dead. These heart cases should remind us that the disease is a serious one even when apparently mild, and that the period of convalescence requires careful and faithful oversight. Fifteen is a large percentage to be due to one complication.

This examination of fatal diphtheria cases has strengthened the belief in my mind that we possess adequate means for the general control of the disease in our diagnostic facilities and in our remedy, antitoxin. We seem to be still weak in our knowledge of the nature and action of this remedy and we show consequent hesitancy in applying it in its most effective form in the critical case. Both medical and lay persons still have wrong impressions regarding its powers and the dangers connected with it. The degree of our success in the clinical control of this disease will depend on the dissemination of accurate knowledge concerning it and concerning the nature and action of our effective remedy for it.

VI.

DIPHTHERIA.

By WILLIAM H. PARK, M.D., NEW YORK.

THE invitation which was extended to me to address this meeting was largely given for the purpose of informing you of the results of the

investigations carried on in the New York City Health Department hospitals and laboratories in the use of the Schick test in estimating immunity and of the toxin-antitoxin mixtures in producing it. I appreciate the opportunity of appearing here.

Before taking up these subjects, I want to say a word about danger from sensitization to serum and the dosage of antitoxin. These subjects have already been ably discussed by Dr. Hitchcock. So far as the danger of a repeated injection is concerned, I have long learned to have no fear of a second subcutaneous injection in those sensitized by a previous one. We have never had, in New York, a fatal accident from any injection except the first, and if it ever happens in other localities, it must be very exceptional. In fact, it has seemed to me that a person who has had a previous injection without serious results is insured against a fatal accident from any subsequent injection. An accelerated reaction is frequently met with, but this is disagreeable rather than dangerous. Sudden deaths have occurred in those having the condition of status lymphaticus and severe symptoms have occurred in those who have suffered previously from asthma. So far as the dosage is concerned, I entirely agree with Dr. Hitchcock as to the importance of giving a sufficiently large primary dose, but he disagrees somewhat from me in the opinion that if an insufficient dose is given later, a larger dose will remove the harm of not having given sufficient at the first dose. Unless the first dose is very small indeed, the second and third doses have practically no effect. The toxin left untouched by the insufficient dose has acted and cannot be neutralized. A subcutaneous injection of antitoxin is supplying antitoxin to the blood for at least 48 hours from the time of the injection. The antitoxic globulin is very slow to be absorbed. We do not give the amount of antitoxin which we do because of any definite amount of toxin in the body which we are trying to match. Ten thousand units of antitoxin will undoubtedly neutralize 1000 times the amount of toxin in any case. We have frequently tested the amount of toxin in the serious cases entering the hospital and we have never found more than a fraction of a fatal dose for a guinea pig in 1 cc. of the serum. The large injection is given to lessen the interval between the injection and the absorption of sufficient antitoxin by the blood and its later passage to the lymph throughout the body and its access to the cells.

Before considering immunization, I wish to state a word about our having returned to the old practice, in New York, of requiring a period of 12 days before examining throat cultures for the removal of quarantine.

Investigation showed us that about 25% of the cases cleared before the twelfth day on two primary cultures were found to be still infected

when repeated and somewhat more careful cultures were made. As the majority of these mistakes were, as stated, before fourteen days, we decided to go back to our early methods and require twelve days after the beginning of illness before examining cultures for clearance. This does not prolong the average period of isolation for more than a day or two and it gives the family a definite period of 14 days to look forward to as the probable limit of isolation.

The use of the toxin-antitoxin mixtures to immunize children is an interesting recent development which has been taken up years after the experimental evidence suggesting it was obtained. Babes was the first to show definitely that if antitoxin was added to toxin just sufficiently to neutralize it so that it would not cause destruction of life in the guinea pig, it still did not prevent the toxin from causing, in the body of the injected animal, the production of antitoxin. Later, the different laboratories producing antitoxin confirmed his results and some used the mixture practically in the immunization of horses. Since 1897, the Health Department horses have been started with the toxin-antitoxin mixture. Several years ago, Dr. Theobald Smith definitely suggested, after experimenting with guinea pigs and showing the long immunity given by the mixture, that children be immunized. It remained, however, for von Behring actually to use it. His use of it was made practicable by the previous discovery of Schick,—that by the use intracutaneously of injections of minute amounts of toxin human beings could be divided into those which had antitoxin immunity and those which had not. The former were immune, while the latter were subject to possible infection. As you all know, he injected intracutaneously 1/50 of a fatal dose of toxin contained in 1/10 of a cc. of salt solution. We have usually used 2/10 of a cc., containing the same amount of toxin. Other modifications have been suggested, as for instance, Koplik uses a minute amount of the undiluted toxin held in the point of a needle. This loaded needle is simply inserted intracutaneously, and withdrawn after a few seconds.

Dr. Zingher, in the Health Department Laboratories has devised a very simple method of preparing the test toxin to be given in the usual way. A sufficient amount is placed in a glass capillary tube. This blown into 10 cc. of salt solution gives a strength in which 2/10 of a cc. contains 1/50 of a fatal dose. This dilution is not stable, and should be used only on the day upon which it is made. The undiluted toxin is quite stable when kept cool and protected from access of air.

We have now used the Schick reaction in some 12,000 healthy children in institutions, and in some 1500 convalescing cases of scarlet fever. As you know, infants at birth have an immunity transmitted to them from their mothers. This antitoxin is gradually eliminated, so that

in from six months to two years, it has disappeared. At about six months of age a certain proportion of children begin to produce antitoxin, and as they grow older a larger and larger proportion develop immunity. There is, therefore, a larger and larger proportion of susceptible children during the first few months of life, and then a lesser and lesser proportion as the self-developed immunity appears. In healthy children between two and four years of age, we have found 32% positive; from four to five years, about 25%; and for the following years, about 20%. That is, some 70% of all children are immune and some 80% adults. Curiously enough, it is found that among the children convalescing from scarlet fever there are about 50% more susceptible persons than among healthy children of the same age. This discovery probably accounts for Schick's greater percentage of positive reactions. Either those lacking immunity to diphtheria tend also to lack immunity to scarlet fever, or the disease itself lessens the amount of antitoxin.

Without the Schick test, all people exposed or to be possibly exposed to infection would have to receive either a passive or an active immunization if we wished to immunize them. The Schick test enables us to dispense with such immunization in about 70% of all cases. All who have used the Schick test know that it must be used with care. It is absolutely necessary to be sure that the toxin is of about the strength desired, because if it has deteriorated, of course no positive test develops in the susceptible. With suitable toxin, a negative test probably gives us absolute security that the case cannot become infected with diphtheria. There is a possible exception in very young infants, in which some claim a reaction does not develop with the usual strength of toxin, even though immunity is absent. A positive test may or may not be a real test, as a slight amount of diphtheria bacillus substance passes off to the culture fluid with the toxin, and this or the peptone may give a pseudo-reaction in those having antitoxic immunity. This occurs more quickly, and disappears more quickly than the toxin reaction. It is well in important cases to give either some heated toxin or some fully neutralized toxin as a control in order to differentiate between the true and pseudo-reactions. Cases that develop antitoxic immunity naturally probably remain immune for life.

The Immunizing Injection. The antitoxin is added to the toxin in sufficient amount so that an amount of the mixture containing an L+ dose of toxin produces a very slight local inflammation, but does not cause death of the injected guinea pig. We have injected a child under one year with about 1/2 of an L+ dose of neutralized toxin; a child under two, a full L+ dose; a child under four, 1 1/2 L+ doses, and after that age, two full L+ doses. All injections are made subcutaneously. We have tried

in some cases a single injection, in others two and others three. The exact amount of the neutralized toxin and the number of doses is still under investigation. If people are injected who have natural antitoxin, a very rapid response is made, and within seven days marked antitoxin accumulation is obtained. In those, however, who have no antitoxin no appreciable response takes place for fourteen days, and in 50% not before four weeks. Not until three months does the full response take place. A quicker and more abundant production of antitoxin occurs after three immunizations than after two, but even after one immunization some 95% of the children are immune after three months. We have traced these children for from six months to a year and a half, and up to the present time, practically every case has remained immune. These 1200 children are in institutions and they will be tested every three months. Within a few years we will know definitely the length of the immunity. The very same results are found in animals, those having natural immunity responding rapidly and the others slowly, to the injections.

It is important to remember that only 95% of the susceptible become immune, and the remaining 5% of the non-immunes must be protected by antitoxin, in the presence of infection. We find that so far as the deleterious effects go, about 4% of the children show a marked reaction for twenty-four to thirty-six hours. We have seen no deleterious effect after the reaction has subsided. In about 10%, we have a rise in temperature of two degrees, and there is a local swelling, which seemed to be due more to anaphylaxis than to a toxin dose.

The results so far obtained prove that, while the toxin-antitoxin solution will not give any appreciable immunity until the lapse of at least two weeks, and usually not until four to twelve weeks, it will finally produce a lasting immunity in at least 95% of all children. It has, therefore, already become a practical measure in institutions. Its wider use must be determined after considering the degree of danger and the ease of administration. The Schick test has become established as one of great practical value.

VII.

WHOOPIING COUGH: THE MEASURES TO BE TAKEN FOR ITS CONTROL AND PREVENTION.

By JOHN LOVETT MORSE, M.D., BOSTON.

The mortality from whooping cough in children under five years of age in thirty states in 1911 was 6251; from scarlet fever, 4232; and from diphtheria, 9579; 3860 children under five years of age died of bronchitis and bronchopneumonia during the same period in eleven states in which 1216 died of whooping cough.

A considerable proportion of these cases were undoubtedly secondary to whooping cough, and should be charged up to it. The morbidity, mortality and percentage death rate of some of the most common infectious diseases in Massachusetts in 1915 were as follows: These figures are, however, owing to the imperfect regulations regarding vital statistics, only approximate.

Disease.	Morbidity.	Mortality.	Percentage Deaths.
Measles	22,356	142	0.6
Scarlet fever	8,520	189	2.2
Whooping cough	7,029	262	3.7
Diphtheria	9,330	648	6.8
Typhoid fever	2,189	195	8.9

In Boston, in 1915, there were reported 388 cases of typhoid fever, with 40 deaths; 2190 cases of whooping cough, with 111 deaths; 2959 cases of scarlet fever, with only 79 deaths; and 2942 cases of diphtheria, with 218 deaths.

It is evident from these figures that, instead of being a trifling affair, as it is usually considered to be by the laity and also, unfortunately, by many physicians, whooping cough is a most serious and fatal disease. It is certainly important enough to deserve, or rather to demand, far more strenuous efforts for its control and prevention than have been given it in the past.

There are certain other points in relation to the mortality from whooping cough which are also of great importance: 57% of the fatalities in the United States in 1906 were in the first year, 23% in the second, 8% in the third, 4% in the fourth, and 2.5% in the fifth year; that is, about 95% in the first five years of life. These figures are corroborated by many other more recent, but smaller, statistics. It is a comparatively mild affection in healthy children over five years of age, and after puberty it is rarely fatal. The importance of these figures will be evident when the measures to be taken to control the disease are considered.

The first thing to be done in the fight against whooping cough is to convince both the laity and physicians of the seriousness of the disease, and of the necessity for its control and prevention. Nothing of importance can be accomplished until they are so convinced. The only way in which they can be convinced is by a campaign of education, which must be led by the United States Public Health Service, the boards of health of a few of the states and large cities, and the pediatricians, who at present seem to be the only ones who appreciate the importance of the subject. How much such a campaign is needed is evident when it is realized that whooping cough is a notifiable disease in less than three-quarters of the states, that isolation is required in only one-quarter of them, and then rarely enforced, that at least two states have no law forbidding the attendance of children ill with whooping cough at school, and that many other states allow the other children in the family to attend school, whether they

have had the disease or not. The regulations of the cities are better than those of the states, but many of them do not require notification, almost none of them isolation, and in several, children ill with whooping cough are allowed to attend school.

Physicians can be educated by lectures, circulars, articles in the medical journals and more stringent regulations for the control of the disease. Nothing will educate them more quickly than the imposition of fines for the failure to report cases of this disease. The laity can be educated by articles in the newspapers and monthly magazines, circulars, instruction by visiting nurses, advice of physicians, and the establishment and enforcement of stringent regulations as to the isolation of children ill with it.

It is necessary, in order to make satisfactory regulations for the control and prevention of a disease, to know in the first place what is the cause of the disease. If its cause is a micro-organism, it is also necessary to know how it enters and leaves the body, its habitat in the body, and its habitat and viability outside of the human body. The fact that the causative organism of a disease is known is of comparatively little avail, unless the early symptoms of the disease are sufficiently characteristic to suggest its presence, and the time at which it is contagious is known.

The recent investigations of Mallory have proved conclusively that the Bordet-Gengou bacillus is the cause of whooping cough. It is probable that there are many strains of this organism. The Bordet-Gengou bacillus enters the body through the mouth and nose. Its habitat is the respiratory tract, chiefly between the cilia of the epithelium lining the trachea and bronchi. It leaves the body in the secretions of the respiratory tract. It is present in the sputum in the catarrhal stage, and is most abundant at this time and in the first two or three weeks of the spasmodic stage. It has been found in the sputum as late as the eighth week of the spasmodic stage. It is fair to assume, therefore, that whooping cough, while most contagious during the catarrhal and early weeks of the spasmodic stage, is also contagious throughout the whole of the spasmodic stage. Kittens, puppies and monkeys may be infected with the disease. This probably happens so seldom under ordinary conditions, however, that infection from animals can, for all practical purposes, be disregarded. The Bordet-Gengou bacillus is very easily destroyed outside of the body. Indirect contagion is, therefore, very unusual, and of but little importance.

The staining of smears of the sputum by proper methods gives reasonably satisfactory results in the early stages of the disease. The organisms become progressively less numerous, however, and cannot be recognized if there is a complicating bronchitis or bronchopneumonia.

There is considerable danger, however, of mistaking the influenza bacillus for this organism in sputum. It is very important that the sputum to be examined is obtained from the trachea and bronchi, and not from the secretions of the nose and throat. The isolation and recognition of the organism by cultures is, however, too complicated a procedure for practical everyday use. It can only be done by an expert, and requires a considerable length of time. This method is, therefore, not practicable at present for preventive work.

An agglutination reaction is present in many cases, but it is not constant, and is usually not very high. Its presence is proof of whooping cough; its absence does not count much against it. A complement-fixation reaction is present in a considerable proportion of children ill with whooping cough and convalescent from it. The general experience has been that this reaction is seldom present earlier than the fourth day of the paroxysmal stage, at a time when anyone can make the diagnosis on the presence of the whoop and characteristic paroxysms. Friedlander, however, claims, by his special method of performing the test, to have obtained positive results in nearly 100% of cases in the catarrhal stage. The reaction is stronger during convalescence, and may persist for a good many months. Both of these tests are, however, too difficult of performance to be of practical utility for everyday use. The complement-fixation reaction should, however, especially if Friedlander's results are proved to be accurate, be of great service in the recognition of abortive and atypical cases under exceptional circumstances, when such recognition is of great importance.

There is an increase in the total number of white corpuscles, with an absolute and relative increase in the number of lymphocytes, in the catarrhal stage of whooping cough. The leucocytosis and lymphocytosis increase with the severity of the disease, reaching their highest point in the paroxysmal stage. There is either no leucocytosis or a leucocytosis with a relative increase in the polynuclear neutrophils, in the diseases with which whooping cough may be confused. This blood formula is a fairly constant one in whooping cough, and would be expected, therefore, to be of considerable assistance in its diagnosis before the appearance of the characteristic whoop. It is, however, not always present and may be absent, if there is some complication which is accompanied by a polynuclear leucocytosis. While, therefore, of some assistance in the early diagnosis of whooping cough, it cannot be trusted implicitly.

It is evident that, while the examination of the blood and sputum and the complement-fixation test are of undoubted value in the diagnosis of whooping cough, they are not at present of great practical utility in the recognition and prevention of the spread of this disease. It is

probable that in the future, with improvements in bacteriological technic, they will be of more assistance.

The greatest obstacles to the control and prevention of whooping cough are the facts that the early symptoms are so indefinite, that it is most contagious at the time when it is impossible to recognize it clinically, and that extremely mild types of the disease are not at all uncommon. It is possible, too, that whooping cough may, like certain other diseases, be spread by healthy "carriers." These facts should not be used, however, as arguments against the isolation of children ill with whooping cough, because whooping cough is undoubtedly contagious after its nature is plainly manifest. There is no reason why a child known to have whooping cough should be allowed at large to spread contagion, simply because it may have infected others before it was known to have the disease. An ounce of prevention may not be as good as a pound, but it is, nevertheless, an ounce.

Whooping cough must everywhere be made a reportable disease, and the same penalties imposed for failure to report it as in the case of smallpox, scarlet fever and diphtheria. The health authorities are then in a position to instruct the parents as to the seriousness of the disease, the way in which it is spread and the measures to be employed to prevent contagion. The importance of preventing babies from having the disease should be especially emphasized. The sputum and vomitus should be treated in the same way as in tuberculosis. The house should be placarded. It may be that this is not of great importance. It does, however, enable people to keep away from places where there is known to be contagion, if they wish to do so. It certainly seems reasonable to give people a chance to avoid known exposure, even if they cannot keep away from unknown contagion. The point to be especially aimed at in the isolation of whooping cough is to prevent the infection of babies and young children. The patients should be separated from the other children in the family, if they are under five years of age. If such separation is impossible, the patients should be removed by the health authorities to special hospitals provided for the purpose. These hospitals should be constructed on the "shack" plan, in order to give the children the maximum amount of fresh air, and thus to prevent the development of complications and cross-infection, and so situated that the children can be up and out of doors in suitable weather. There is no reason why children should be isolated in one room and not allowed to go out of doors, provided they are kept away from other children. They ought not to be allowed on the street at all during the acute and most contagious stage of the disease. Later, it may be allowable for them, provided they are attended by an adult. In order to protect other children

in case they do get on the street, they should be required to wear an arm-band of some prescribed color and labeled "whooping cough," in large letters. Arm-bands have been objected to and even ridiculed by certain writers. They claim that they are useless and unnecessary. It does not seem to me that they are, however, as there is no other way in which others can know that a child has whooping cough, unless they hear it whoop. If the child is labeled, careful parents can keep their children away from it. There is no other way in which children with whooping cough can be promptly recognized and certainly excluded from places of public congregation and public conveyances, which, as everyone agrees, should be done. It would not be a bad plan to compel children who have been exposed to whooping cough also to wear a band. Children who fail to observe the quarantine regulations should be at once sent to the hospital by the public authorities, no matter what their circumstances or social position.

There is considerable difference of opinion as to how long quarantine should be kept up. Some authorities believe that, as the Bordet-Gengou bacilli are seldom present in large numbers in the sputum after the first two weeks of the paroxysmal stage, it is useless to continue the quarantine beyond this period. This does not seem to me to be a reasonable position, because the organisms have been found as late as the eighth week, and because in the later stages of the disease the organisms, although they may be present, are very difficult of recognition on account of the large number of the other bacteria. Still other authorities fix a certain number of weeks as the period of quarantine, without regard to the severity and duration of the symptoms in the individual case. It would seem more reasonable to fix the time of quarantine at one week after the cessation of the characteristic paroxysms, as these paroxysms presumably mark the active period of the disease. If such a regulation is not feasible, a quarantine of five or six weeks is a reasonably safe one. It is to be hoped that in the future such advances will be made in the recognition of the Bordet-Gengou bacillus, both in smears and cultures, that the period of quarantine can be regulated in the same way as is now done in the case of diphtheria.

The vitality of the Bordet-Gengou bacillus outside of the body being slight, formal disinfection is not necessary. Thorough cleaning and airing of the premises is all that is required.

The other children in the family should not be allowed to attend school unless they have already had the disease or until two weeks have elapsed since the last exposure, provided they are free from catarrhal symptoms. It is possible that this period of two weeks may be too short, the evidence as to the length of the incubation period of whooping cough being unsatisfactory. Present observations seem to

show, however, that it varies between two and ten days. Two weeks should, therefore, be amply sufficient. Children with catarrhal symptoms, in whom there is any reason to suspect the possibility of whooping cough, should also be excluded from school.

It will be impossible to control whooping cough properly and prevent its spread until hospitals for the accommodation of children ill with whooping cough are established by the community. Such hospitals are necessary for several reasons: first, to take care of those children whose parents, because of poverty or ignorance, cannot give them proper care and isolation at home; second, to protect the public by isolating those children whose parents are unwilling to obey the regulations as to quarantine; third, to give suitable hospital treatment to babies and children seriously ill with the disease, and its complications—bronchitis and bronchopneumonia.

Objections to the establishment of hospitals for the care of whooping cough have been raised on the grounds that only a small proportion of the cases can be taken care of; that on account of the difficulty in recognizing the disease in its early stages, when it is probably most contagious, the children are admitted too late to afford much protection to the public, and that there is great danger of cross-infection and the development of bronchopneumonia in hospitals. The first two objections are, to a certain extent, valid. It does not seem reasonable, however, to argue that it is needless to do anything to protect the public from whooping cough simply because the protection afforded cannot be made perfect. It seems to me that a little protection is better than none. Experience in hospitals built on the "shaek" plan, in which the patients get an abundance of fresh air, has shown that the last objection has no foundation in fact.

It is obviously impossible to treat children ill with whooping cough in dispensaries or outpatient departments where other children are treated. It would be hard to find better places in which to spread contagion. Nevertheless, there are a large number of ambulant cases of whooping cough which would be benefited by treatment in dispensaries. Dispensaries for the treatment of whooping cough, and nothing but whooping cough, should, therefore, be established in the thickly settled portions of our large cities. The patients treated should, however, come only from the immediate neighborhood, because of the danger of spreading contagion if they come in public conveyances. The City of New York established such a clinic not quite two years ago. The results obtained have been most satisfactory, and warrant the establishment of more stations.

It is obvious that, if there was some method of treatment which had a curative action in whooping cough and would protect against the

development of the disease, it would aid more to control, prevent and diminish the mortality from whooping cough than all the other means which have been considered together. Such an action has been claimed for the vaccine treatment. Hartshorn and Moeller, writing in August, 1914 (*Archives of Pediatrics*, 1914, xxxi, 586), revealed all the literature of the subject up to that time, a total of 1445 cases. They concluded that there was no universal endorsement of the vaccine treatment, although there was a striking lack of negative reports, that there was no definite standard of dosage, and that the dosage had apparently often been too small. They decided that its value as a prophylactic agent was undetermined, that the earlier the treatment was begun the better were the results, and that it was worthy of a more extended trial. Their own results in seventeen cases were inconclusive. Their conclusions represent the consensus of opinion of conservative observers at that time. The results of Hess (*International Clinics*, 24, s. iii, 97), Frankel (*Kentucky Medical Journal*, 1915, xiii, 458), and the New York City Board of Health, reported by Luttinger (*New York Medical Journal*, 1915, ci, 1043), are, however, more favorable. Hess used the vaccine as a prophylactic in an epidemic of whooping cough in the New York Hebrew Asylum; 244 children were given the vaccine and only 21 developed whooping cough, a percentage of 8.6; 131 others were not given the vaccine. A considerable proportion of these were babies who had practically no exposure. Sixty of 80 who were exposed, or 75%, developed the disease. Frankel gave prophylactic injections to 10 babies in an institution, who were constantly exposed. None of them contracted the disease. Luttinger gave nine prophylactic injections and none of the children developed pertussis. He also treated 138 children with vaccines, 115 of them being within the first three weeks of the paroxysmal stage. In comparison with a control series treated in other ways, the paroxysmal stage was shortened by over two weeks. There was, moreover, a prompt amelioration of the symptoms in nearly all cases. These results seem to show that vaccines are of considerable value as a prophylactic against whooping cough, and that they have some curative action after the disease is established. It is to be hoped that these results will be confirmed in the future. At present they certainly seem to make it advisable to use vaccines as a prophylactic, and justify their further trial in the treatment of this disease. The most favorable results have apparently been obtained with polyvalent stock vaccines. The dosage recommended by the New York City Board of Health for prophylaxis is, for children, 500 millions, one billion and two billions, at three-day intervals. They advise for treatment, an initial dose of 250 millions for children less than one year old, this dose to be

doubled every second day. Children over a year receive an initial dose of 500 millions. The dose may be increased as high as 10 billions.

If the vaccines prove to have the value in prophylaxis and in treatment which the results of the last two years suggest that they may have, the control of whooping cough will be a relatively simple matter. Even if they do not, however, it can be confidently predicted that when physicians and the public understand what whooping cough really means, when proper regulations for its control are established and enforced, and when sufficient hospital and dispensary accommodations for its care are provided, whooping cough will cease to be the scourge which it now is.

Book Reviews.

The American Year-Book of Anesthesia and Analgesia. Edited by F. H. McMECHAN. New York: Surgery Publishing Company. 1915.

This publication has been established for the collation of the world's scientific research on anesthesia and analgesia and represents the collaboration of well-known experts in the various fields of these subjects. It is the intention that this first issue should summarize the progress in them to the present time. Subsequent issues, by means of collected abstracts, are to continue the revision of these subjects as necessity arises and will deal also with other new subjects of equally interesting importance. This volume contains thirty-one articles on selected topics. Among these may be noted one by Dr. George W. Crile of Cleveland on "Anesthesia, Anemia and Resuscitation;" by Dr. James Taloe Gwathmey of New York City on "Ether-Oil Colonie Anesthesia;" by Dr. Kurt A. Thoma on "Local Anesthesia for Dentistry;" by Dr. Yandel Henderson and Dr. W. T. Porter of New Haven, Conn., and by Dr. George G. Smith of Boston on spinal anesthesia in neurology. The work is illustrated with a large number of excellent figures and constitutes a useful contribution to the knowledge and progress of anesthesia.

Diseases of the Skin. By RICHARD L. SUTTON, M.D., Professor of Diseases of the Skin, University of Kansas School of Medicine. 693 Illustrations and 8 Colored Plates. St. Louis: C. V. Mosby Company. 1916.

Dr. Sutton has written an excellent textbook along the lines that he has chosen, his purpose being "to present the entire subject of dermatology in a comprehensive and at the same time concise manner." The style is clear and succinct, and the wording well chosen and plain—

a model of its kind, in the midst of the number of loosely written treatises that have appeared of late years. Besides a proper amount of space devoted to the more common dermatoses, the author has added a few valuable and timely words on subjects that are of considerable dermatological interest, but are accorded as a rule either a brief notice or none at all. Among these subjects may be mentioned "X-ray and Radium Dermatitis," "Tattoo Marks and Powder Stains," "Paraffinoma," "Frambesia," and "Brown-tail moth." On the subject of treatment he is refreshingly concise and logical, maintaining a wise conservatism on many of the newer methods that are still *sub judice*, but that have been over-exploited by those ever ready to seize the innovations, while forgetting the services that have been rendered by the well-tried procedures. For example, with regard to the vaccine treatment of acne, he voices the judgment of the majority of experienced dermatologists in declaring that it has proved extremely disappointing, and adds that he has practically abandoned its use. The book is a thoroughly American book, and gives a considerable prominence to the views and to the work of American authors. The illustrations are all excellent, and do not comprise any of the time-honored but antiquated reproductions that mar so many of the textbooks with which we have of late been swamped. A number of inaccuracies and typographical errors will be rectified in the succeeding editions. The author is to be congratulated upon having outstripped most of the recent competitors in this field of medicine.

An Index of Treatment. By various writers.

Edited by ROBERT HUTCHISON, M.D., F.R.C.P., and JAMES SHERREN, F.R.C.S. Revised to conform with American Usage by WARREN COLEMAN, M.D. Seventh Edition revised and enlarged. New York: William Wood & Company. 1915.

The sixth edition of this standard work on therapeutics was reviewed in the issue of the Journal for October 3, 1912 (Vol. CLXVII, page 481). In this seventh edition all the articles have been thoroughly revised and in many cases rewritten. Several new articles have been the psychoneuroses. In this American edition the dosages of drugs have been modified to conform with the United States Pharmacopeia and National Formulary. The text of the English edition has also been slightly altered in a few articles. The subjects, which are arranged alphabetically from abdominal injuries to yellow fever, have been contributed by a number of distinguished physicians and surgeons. In this edition Mr. Sherren replaces Mr. H. Stansfield Collier as surgical editor. An appendix contains a number of useful prescriptions and the entire work should continue its popular practical value to the profession.

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ANCIENT HISTORY OF YELLOW FEVER.

SEVERAL interesting documents pertaining to the earlier history of yellow fever in the United States, which have recently come to our attention, illustrate interestingly the rapidity with which medical progress, viewed in retrospect, has advanced in the light of discoveries made not really so long ago, yet proving revolutionary in their consequences. One of these documents is a clipping sent by a Boston physician, a former editor of the JOURNAL, from a newspaper of September 17, 1873, describing an epidemic of yellow fever then in progress at Shreveport, La. A telegram to New York on September 16 stated that there were then six hundred cases of the disease at Shreveport and not enough well people left to care for the sick. "The fever is unusually fatal. It is believed to be Mexican vomito introduced by a circus." Evidently the fever was at the same time prevalent also at

Memphis, Tenn., Little Rock, Ark., and other points throughout the South. A news report from Memphis on September 16, 1873, said:

"There is no abatement of the yellow fever, though its ravages are almost exclusively confined to the northwestern portion of the city, adjacent to the mouth of Wolf River, where it first appeared. It is impossible to obtain reliable data in regard to the mortality, but it is evident that there is no decrease in the death rate. The city authorities today took the first steps towards meeting the exigencies of the occasion. The whole street force is being put to work distributing coal tar and burning it in the infected quarter. The white citizens met and organized a Howard Association. The association will open an office tomorrow, and be prepared to furnish nurses and relief to all who apply. Physicians are advising all that can to leave the city, and the trains in all directions are crowded. The wildest reports are circulated throughout the country in regard to the number of dying, but it is safe to say that since the disease appeared the number of deaths from all causes has not reached twenty on any other day, and since the flight of the horror-stricken ones there is less excitement than during the prevalence of the cholera."

The following sketch of the city of Shreveport at that time presents a vivid picture of the local conditions of suffering, apprehension and disturbance of daily life produced by a typical yellow fever epidemic in the days before knowledge had robbed the disease of its terror.

"Shreveport, where the yellow fever has been creating such terrible havoc, is the second city in Louisiana, both in population and commercial importance, it being the great centre of trade for the Red River country. Before the war it had about three thousand inhabitants, but on the close of the war many Northern men went into business there, and the place became an active, enterprising business city, rapidly growing in population, until it is now estimated to have between 10,000 and 13,000 inhabitants. It owes its commercial importance to the fact that it occupies the only available site on the Red River for such a place, there being no good landing place on the west bank of the river within a hundred miles. The Red River valley is the richest region in the country for the production of sugar and cotton, and this makes Shreveport one of the greatest markets in the valley of the Mississippi, or its tributaries, for those staples. Shreveport is something like five hundred miles up the Red River, and is one hundred miles west of Vicksburg. It is at the head of steamboat navigation, and fifteen miles below the great Red River raft, which is one of the most remarkable formations in the world, being a mass of logs and driftwood over forty miles long, and entirely choking up the great stream, which is over 1200 miles long, or, including the

South Fork, 2100. This raft turns the water of the river over the adjacent country, forming great bayous, through which, at high water, steamboats pass around the raft. It has been forming for many years, and is now being removed by the national government. The work is prosecuted by blasting, and when the improvement is completed, steamers will be able to go without interruption up to Fulton, and at high water the river will be navigable as far as the confluence with the branches. Shreveport is on high ground, forming a bluff at the river bank, and is well situated for drainage. The whole country around is flat, and for miles and miles there is one continuous succession of marshes, swamps and bayous, for over one hundred miles to the west, there being one chain of the great bayous formed by the raft. Though at low water a great surface is exposed to the action of the sun, making the surrounding country subject to malarial influences in the hot season, still the health of the city has generally been good. This is the third time the place has been visited by the yellow fever to any extent since it was settled, the first time having been in 1853, and the second in 1867. There has, however, never been anything like the terrible pestilence which is now devastating the place. Many who are conversant with the matter, charge the affliction directly to the Kellogg government. For several months the place has been without a municipal government, the city government elected by the people having been deposed. Those having control of the city have been utterly negligent of their duty, and the streets were in an indescribably filthy condition. Under the hot semi-tropical sun the reeking heaps of garbage became the sources whence the seeds of the pestilence sprang into active life. The indifference of the lower classes, ignorant of the danger which threatened, aggravated the evil brought about by the criminal neglect of the authorities. Then a steamboat, with hundreds of cattle on board, sunk opposite the city. The cattle were carried down with the craft, and there was no attempt made to move them. The receding waters left the wreck exposed, and there, day after day were seen, in full view, the putrid carcasses, rotting in the hot sun, and vultures revelling in carrion. From this a sickening stench, powerful and penetrating, was wafted over the unfortunate city, and hastened the coming of the dread disease. The yellow fever soon made its appearance in its most malignant type. Everyone who could left the city, no one remaining behind but the poor and those compelled by the greatest necessity. The present condition of affairs is truly pitiable, and the stricken place deserves the sympathy and aid of our more fortunate citizens."

The second document, to which reference was above made, is a sketch of yellow fever in Florida by a Boston physician, the manuscript of

which is dated December 6, 1888, just ten years before the work of Walter Reed and his commission. The text of this hitherto unpublished sketch is as follows:

"The usual climatic influences of the season of the year may probably be safely relied upon to hold at bay for some months the yellow fever scourge which has presented itself in epidemic form at various points in the state of Florida during the past summer and autumn. The longer and warmer days, however, will soon return, and with the increasing power of the sun all the necessary elements to start into renewed activity the dormant disease-germs which are allowed to linger through the winter.

After the unsuccessful campaign of the season just ended against the disease, the renewal of the struggle is already anticipated with anxious expectation by the inhabitants of the infected communities and by those of neighboring States lying within the yellow fever zone. Questions of prevention are of the first importance, and destruction of disease germs is the problem of the moment.

Among the objects universally recognized as most dangerous foci of infection are the clothing, bedding and personal effects of families among whom cases of yellow fever have existed. There are reasons to believe that by such household articles, yellow fever was carried from Havana to Key West last year.

There is probably but one opinion among competent and impartial judges as to the desirability, we might better say the imperative necessity, for the thorough disinfection, or, where bulk renders thorough disinfection uncertain or impossible, the complete destruction of such suspected articles. On the other hand, the destruction of these things, without compensation, is impossible, whether from the practical or the humane point of view.

Granted that there should be effective destruction, and that there must be compensation, it is simply a question of whence the compensation should come. State rights and privileges should carry with them state duties; but in Florida there is no central sanitary authority, the smaller communities are very poor, and even a city like Jacksonville is said not to be in a condition to do this work for itself, being hampered by a charter provision which forbids an annual expenditure greater than 1% of its assessed valuation; it has no ready funds, and

the Sanitary Auxiliary Association is reported to have recently loaned the city \$5000. Under such circumstances local authorities can hardly be trusted with the execution of the proposed prophylactic measures.

Drs. Porter and Guiteras, as agents of the United States through the Marine Hospital Bureau, have been already engaged in a house-to-house inspection in the city of Jacksonville and elsewhere and have ordered the destruction by fire of such articles as they deem necessary, for which no compensation is provided. Poor people, however, will not give up their bedding to be burned, without compensation, and it seems almost inevitable that the Federal Government must in this instance, however bad such precedents may be, assume the expense, as well as the responsibility, of making such measures as effective as possible. An appropriation of \$100,000 was made by Congress for stamping out the epidemic, and some of this should be available.

On the other hand, even should the necessary funds be available to insure the effective destruction of existing fomites, there seems to be no present security and no reasonable probability of future security against the repeated introduction from Havana of equally pestilential articles. Even a patrol or blockade by United States cruisers of a coast with the length and peculiar characteristics of the Florida coast would offer a poor guarantee against the light-draught, fast sailing "viveras" or fishing smacks and the tramps which carry on a traffic, legitimate or illegitimate, between Cuba and Florida. In all probability, whatever measures are adopted by our own federal or local governments, as long as there exists at the very doors of our Southern States such a breeder of yellow fever as the port of Havana, they will be liable to epidemic outbreaks of this disease. A recent report, even though not confirmed, of the arrival in a New York tenement house of a family direct from Jacksonville, one member of which developed suspicious symptoms, is an indication of what may be anticipated, and serves to remind us that in the questions to which we have alluded, all parts of the country are concerned."

Appended to the above sketch is a note of comment by another physician, then connected with the United States Army Medical Service in Washington, in which he calls attention to

the fact that there are abundant means for disinfecting clothing and bedding, presumably infected by yellow fever, which do not involve their destruction as burning does.

"No one, I presume, doubts that boiling for 15 minutes would be quite sufficient to destroy the yellow fever germ. Nor do I believe it would survive 24 hours' exposure to the concentrated fumes of sulphurous acid. Simple boiling and washing is, however, in my judgment, amply sufficient protection combined with thorough aeration of enclosed spaces. As to the general principle that the United States must do this work if it is to be done, I think no one who is acquainted with the condition of affairs in Southern towns will have any doubt. It may not be according to the Constitution, 'as amended,' but it is a necessity all the same. I have taken the ground for the last eight or ten years, that we have a right to demand of the Spanish and Cuban governments that Havana shall be put in decent sanitary condition, on the ground that it is a standing menace to us, as it now is, and I do not believe that any effectual protection of the Gulf Coast from yellow fever will be attained until we do this."

These two documents, dating less than thirty years ago, and representing the best and most expert medical opinion of their time, afford further and striking evidence of the rapidity of medical progress. The history of yellow fever in America during even the second half of the nineteenth century has become already ancient history. Thirty years hence, when we know the whole truth about poliomyelitis, we may look back in the same manner upon our present theories about its transmission and prevention.

PROGRESS OF POLIOMYELITIS.

DURING the past week there has been a definite decline in the prevalence of poliomyelitis throughout the United States. The weekly report of the United States Public Health Service for October 27, 1916, gives the case incidence of the disease in September as follows: New York (exclusive of New York City), 1064; New Jersey, 957; Pennsylvania, 743; Massachusetts, 623; Connecticut, 274; Illinois, 257; Minnesota, 186; Michigan, 166; Wisconsin, 158; Ohio, 138; and Maryland, 100. In October there were 125 cases in Maryland.

In Massachusetts the total number of cases reported in October was 704, with 59 deaths, the largest number in any month during the present epidemic. During the first eleven days of No-

venber 107 new cases were reported in Massachusetts, making a total of 1823 in this State since January 1, 1916.

At its annual meeting in Cincinnati, Ohio, on October 26, the American Public Health Association adopted the following resolution:

"In view of the fact that infantile paralysis has existed for several months and still exists in the United States and Canada, taking on in some localities an epidemic character; that considerable anxiety is expressed by the public generally, and that they, the public, the physicians, and the health authorities may well expect an authoritative statement upon the subject from this Association in annual convention assembled:

"*Be it resolved*, That the president be forthwith authorized to appoint a small committee of specialists and of those who have had experience of the disease with instructions to meet immediately and to prepare a report of the present actual knowledge of the cause of the disease, the manner and agents by which it is spread, the best methods of treatment, and the best preventive measures.

"And that this committee submit its report before the close of this annual meeting, and that such report be given to the public immediately."

In accordance with this resolution, Dr. John F. Anderson, president of the Association, appointed the following physicians to constitute the committee: Dr. Haven Emerson, health commissioner of New York City; Dr. Wade H. Frost, of the United States Public Health Service; and Dr. A. J. Chesley, director of the division of preventable diseases of the Minnesota State Department of Health.

In its report, after summarizing present knowledge of the disease, this committee concluded as follows regarding its prevention, control, and treatment:

"If the foregoing conception of the disease is correct, it is obvious that effective preventive measures, approaching complete control, are impracticable, because isolation of recognized cases of the disease and restraint upon their immediate associates must fail to prevent the spread of infection by unrecognized cases and carriers. These difficulties would appear to be inherent in the nature of the disease. Nevertheless, we may hope for the development of more thorough knowledge, which will permit of more effective control of the disease than is now practicable. Of first importance is the more general recognition by practitioners of non-paralytic cases through clinical observation and laboratory procedures. Lumbar puncture has been shown to offer valuable aid in diagnosis, and a more general use of this test is to be en-

couraged, since it not only facilitates accurate and early diagnosis, but in many cases affords symptomatic relief as a therapeutic procedure. Without undertaking to predict the future progress of research, we may hope for certain possible developments which may afford far more effective control of the disease, with substantial relief from many inconveniences at present inevitable. Among these possibilities we would include a practical test for the detection of all clinical types and carriers, a simple and reliable test for distinguishing between susceptible and insusceptible persons, and means of conferring artificial immunity against poliomyelitis.

"At present our information demands the employment of the following administrative procedures in attempting to control the disease:

"1. The requirement that all recognized and suspected cases be promptly reported.

"2. Isolation of patients in screened premises. The duration of infectivity being unknown, the period of isolation must necessarily be arbitrary. Six weeks has been recommended by the Conference of State and Territorial Health Officers with the Surgeon-General of the Public Health Service as sufficient, and this period has been generally accepted throughout the United States.

"3. Disinfection of all body discharges.

"4. Restriction of the movements of intimate associates of the patient as far as practicable. This should include, at least, exclusion of the children of the family from schools and other gatherings.

"5. Protection of children, as far as possible, from contact with other children or with the general public during epidemics.

"6. Observation of contacts for two weeks after the last exposure."

This report is published in full in the weekly bulletin of the United States Public Health Service for November 3, 1916.

THE POSITION OF STATE EPIDEMIOLOGIST.

IN another column of this issue of the JOURNAL, we publish a notice of a competitive examination for qualification to the position of epidemiologist in the service of the Massachusetts State Department of Health, with the stated regulations governing the appointment of this official. The attention of interested physicians is directed to this notice. The position is one of value and importance to the public and offers attractive prospect of opportunity for service to physicians properly qualified to undertake it. It is highly desirable that the best fitted

candidate should be obtained for this position, and it is expected that the competition for it will be active.

MEDICAL NOTES.

FUMIGATION OF ENGLISH STEAMERS.—United States Federal Health officials have issued a recent order directing the fumigation of steamers arriving at Boston from certain English ports. The reason for this order is believed to be the occurrence of cases of bubonic plague in these ports. During the period between July 1 and October 27, three cases of the disease were reported at Bristol, two at Hull and five at Liverpool.

PREVALENCE OF DISEASE IN THE UNITED STATES.—The weekly report of the United States Public Health Service for October 27, 1916, states that during the month of August there were 28 and in September 15 cases of cerebrospinal meningitis in New York. During September 33 cases of smallpox and 1002 of typhoid fever were reported in Ohio. During the same month there were 28,516 cases of malaria and 455 of pellagra in Mississippi; 725 cases of typhoid fever in New York, 676 in Mississippi, 607 in Indiana, 388 in Michigan, 373 in Kansas, 313 in New Jersey, 308 in West Virginia, and 253 in South Carolina.

TUBERCULOSIS SUNDAY.—It is announced that Sunday, December 3, has been selected for the seventh annual observance of Tuberculosis Sunday throughout the United States. Its purpose is to intensify the education of the public on the subject of tuberculosis and the collection of funds for its relief.

COMBATING INSECTS AFFECTING THE HEALTH OF MAN.—Continued advances in the work of combating the activities of insects affecting the health of man are reported by the Chief of the Bureau of Entomology of the U. S. Department of Agriculture in his annual report recently issued. In mosquito investigations in Louisiana, a species of mosquito hitherto considered a non-carrier of malarial infection was proved to be a carrier. Studies have been made of malaria, and measures are being evolved to meet plantation conditions.

The "starvation" plan, aimed to exterminate the spotted fever tick of the Bitter Root Valley, Montana, was followed during the year with encouraging success. The plan consists of the removal of the domestic hosts of the adult tick from the infested areas. The Bureau also conducted a campaign of extermination against ground squirrels and other rodent hosts of the immature ticks. Examination of the rodents killed showed 40% lower infestation by the tick than during the preceding year.

The report directs attention to the demon-

stration of the Bureau specialists, that the breeding of flies in manure can be prevented by treating the substance with calcium cyanamid and acid phosphate, which at the same time increase the fertilizing value of the manure.

The Bureau also conducted investigations into methods of lessening fly infestation in packing establishments operated under the Meat Inspection Service of the Department.

EUROPEAN WAR NOTES.

MEDICAL ASPECTS OF THE MESOPOTAMIAN CAMPAIGN.—In the issue of the *British Medical Journal* for October 21, 1916, is published an analysis of Sir Percy Lake's dispatch describing the operations of the British troops from January 19 to April 30, 1916, in their unsuccessful attempt to relieve the siege of Kut-el-Amara. After description of the natural features of the country involved in this campaign, Sir Percy refers frequently to the difficulties attending not only the transportation of troops, munitions and food, but the removal of wounded from the field.

"As far as possible, all the wounded were brought in during the withdrawal, but their sufferings and hardships were acute under the existing climatic conditions, when vehicles and stretcher-bearers could scarcely move in the deep mud."

According to the statement of the late Sir Victor Horsley, quoted in an editorial in the same issue of the *British Medical Journal*, "the immediate cause of the appalling failures in the medical arrangements was the utterly defective transport." Sir Percy Lake, in his general summary, at the conclusion of his report, says, in commendation of the personal efficiency and heroism of the medical corps:

"The energy and devotion to duty shown by the personnel of the medical services deserve commendation. Overworked and undermanned as they were during the advance in January—for the greater portion of the medical organizations then in the country had been shut up in Kut, and the medical units of the 3d and 7th Divisions had only begun to arrive—they did their utmost with the means at their disposal to alleviate the sufferings of the sick and wounded. With the arrival in February of the first river hospital ship, *Sikkim*, and a steady increase in personnel, their power of dealing with the situation was considerably improved, as the action on March 8 showed.

"No report on the medical services would be complete without reference to the splendid services rendered by Mr. T. A. Chalmers, of Assam, who brought out, and himself drove, his specially designed motor boat, *Ariel*. He spent his whole time, frequently under fire, in conveying sick and wounded between collecting stations, field ambulances, and river hospital craft in a

manner which no other boat in our possession could have imitated."

Of the military expedition itself, the commenting editorial of the *British Medical Journal* says:

"It would not be easy to mention any British military operation on so large a scale, since Walcheren, which failed so completely, and at so heavy a cost in casualties, medical and surgical, as the attempt to relieve General Townshend's Anglo-Indian force besieged in Kut."

The Walcheren expedition was an unsuccessful and disastrous British campaign against the French in the Netherlands in 1809.

AMERICAN AMBULANCE AT SALONIKI.—Report from Paris states that the American Ambulance Field Service of thirty-one ambulances, two supply cars and twenty-five volunteers, left that city on October 12 for Saloniki. This unit, which for the past eighteen months has rendered distinguished service in Alsace-Lorraine and at Verdun, remains in charge of Mr. Lovering Hill of New York, who has been its leader on the western front.

WAR RELIEF FUNDS.—On Nov. 11, the totals of the principal New England relief funds for the European War reached the following amounts:

Belgian Fund	\$164,208.08
French Wounded Fund	132,570.12
Armenian Fund	114,856.50
French Orphanage Fund	69,594.39
Surgical Dressings Fund	56,858.06
Belgian Tobacco Fund	43,528.19
Italian Fund	27,193.54
Facial Hospital Fund	24,491.03
LaFayette Fund	20,799.53
P. S. D. Fund	10,197.18
French Phthisis Fund	6,309.50

BOSTON AND NEW ENGLAND.

WEEK'S DEATH RATE IN BOSTON.—During the week ending Saturday noon, November 11, 1916, the number of deaths reported was 255, against 182 for the same period last year, with a rate of 17.49 against 12.68 last year. There were 34 deaths under one year of age, against 32 last year, and 66 deaths over 60 years of age, against 55 last year.

The number of cases of principal reportable diseases were: diphtheria, 32; scarlet fever, 18; measles, 10; whooping cough, 6; typhoid fever, 5; tuberculosis, 34.

Included in the above were the following cases of non-residents: diphtheria, 7; scarlet fever, 4; typhoid fever, 1; tuberculosis, 3.

Total deaths from these diseases were: diphtheria, 4; measles, 1; whooping cough, 1; tuberculosis, 14.

Included in the above were the following deaths of non-residents: diphtheria, 1; tuberculosis, 1.

Correspondence.

GAPS IN MEDICAL EDUCATION.

Boston, October 27, 1916.

Mr. Editor:

Many years ago I read with pleasure and admiration a book of careful anatomical research written by Dr. John Calvert Donaldson, now of Philadelphia, on the development of the brain, and I remember a sentence which expressed a provisional conclusion with reference to the question whether or in what sense we have a right to expect a gain among the races of men, in respect to the higher mental qualities, as time goes on. The sentence to which I refer was couched in something like the following words:

Knowledge increases, for the obstacles to knowledge are mainly from without; but wisdom lingers, as the rare product of a balanced brain.

The truth of this sentiment has been brought home to me from time to time, as I suppose it is to everyone, through coming indirectly in contact with practitioners who have gained scientific knowledge and scientific skill, which they utilize for the benefit—or otherwise—of their patients, without exerting at the same time a proportionate amount of wisdom in so doing.

It is my belief that medical schools have a certain responsibility in this matter, and that they ought to do their best not to turn loose upon the community men who are skilful and efficient without being wise. In other words, I think that medical ethics, obligations and responsibilities, in a broad sense, need to be preached and studied in greater detail. It has happened to me not infrequently to have had to deal with patients in whose lives, loneliness and sorrow, and temperaments in which fears were based on misunderstandings of themselves, had played havoc both with their happiness and their metabolism, yet who had passed through the hands of one or another scientific colleague whose treatment of them, perhaps based on a single physical examination, had indicated a complete color-blindness to the true merits of the case.

It might be too much to expect that every practitioner should have an adequate knowledge of the science that deals with the mental aspects of a person's life and history, but there is good reason to feel indignant when this ignorance is too gross, and especially when those whom it characterizes strive to fill up the gap in their knowledge by scraping together a few arguments to show the uselessness of the facts about which they are so strangely unaware.

A recent experience illustrating certain of these points is, in broad outlines, as follows:

A lady of fine, but over-trusting and profoundly neurotic disposition, is on her way home from a distant sanitarium where she had fallen ill with an acute trouble that had been recognized and treated and from which she was convalescent. Having occasion to stop for a brief time at a city within a day's journey of Boston, and feeling still indisposed, she calls in a local practitioner for advice. In a physical sense there was not much the matter, and not much to be done. That this was the practitioner's opinion likewise is shown by the advice that the patient received from him. He was evidently a kindly person and his counsel was adequate to the necessities of the case. So far so good, though had his diagnosis been more far-reaching he might readily have recognized that without further ado she might return to her native city (which may, indeed, be "provincial," as is sometimes said, but still can boast of a good practitioner or two, and opportunities for making clinical studies of all sorts when these are called for). But no: kindly though he was, he had also a laboratory and was equipped to be a scientific doctor in the most modern sense. The consciousness of this carried its obliga-

tions. He must *prove* himself a modern scientist, a soldier of this lord. And so the drum had to be beaten, the bugle sounded, the skilled assistants summoned to make more than one analysis of the (practically normal) urine, and then to draw an ounce of blood (levied on both arms), to be used for chemical investigations of the most elaborate sort. Finally the expired air must also be chemically tested by a method which, as we all know, is of the most delicate description, and which was scheduled for repetition in two days.

It is distinctly to be understood that while these tests were going on the patient was not under close observation, and especially that her diet was under no control whatsoever, so that it is not too much to say that from a really scientific standpoint the results of these careful tests could claim no right to scientific standing. The whole procedure was, in short, a hollow mockery, almost equivalent to the playing of a child with a scientific toy of which he had learned the manipulation. On the other hand, by the time the tests were completed the patient was ready to accept anything that was told her, forgetting or not realizing that her life-long history of emotional strain and conflict had not only received no adequate consideration, but had not been recognized as a factor in *her case*, without a deep knowledge of which these weighable and measurable discoveries could be of little note.

Another instance which in a way was much more aggravated than this, has recently come to my attention, where a lady, known to be on her way to an eminently reputable hospital where she was to be under the care of a man of the best possible standing from every point of view, was positively waylaid by a practitioner whom she called in, in a city where she chanced to stop, with the result that she found herself, after a few days, with a bill on her hands for several hundred dollars, a part of which amount was to go, and did go, utterly in vain, into the pocket of a well-known consultant called from another city, while the rest, equally in vain, went into the pocket-book of the practitioner into whose talons she was so unlucky as to fall.

Such experiences as these justly make one feel indignant. They ought to be exposed and thought about, and those who make it their life study to learn what it really means to have a psychoneurotic illness have a right to feel not only dismay but disgust at the practice of colleagues who use knives and pills and instruments of precision, with great freedom, not alone in cases where these are really indicated as of fundamental value, but in others where their employment is due to the fact that they are tools which their owners have learned to use with a skill the possession of which makes them its willing slave.

JAMES J. PUTNAM, M.D.

THE TREATMENT OF HIP FRACTURES.

Mr. Editor:—

THE JOURNAL of September 28, containing the symposium on fractures, has but just come to my notice; and the incentive for this belated intrusion on the discussion of fracture of the neck of the femur is furnished by the following quotations from Dr. Cotton's paper:

"The best way to be sure of a satisfactory result in hip fractures is to have a system and conviction that makes it unnecessary to look up results."

"Now everyone has been claiming everything for his pet method in all hip fractures."

Being fairly familiar with the literature of this subject, I have attempted to identify the pet methods which have set up the wave of enthusiasm that, according to Dr. Cotton, now ruffles a hitherto stagnant pool.

It hardly seems possible that at this late day anyone has become enthusiastic over conventional treatment, for even the Maxwell modification has been before the profession for upwards of 50 years. Nor does the characterization seem to apply to Moore's treatment, because that is a modification of the abduction method in adaptation to infirmity. Nor to the non-treatment of Binnie, although Dr. Cotton "understands it has given good results." Nor to artificial impaction, Steineman's nails, ice tongs, or primary bone pegging, because all these are of admittedly limited application.

I am forced to the conclusion that the abduction treatment best represents what Dr. Cotton has in mind, because it is based on conviction, and because very definite claims are made in its behalf.

To specify: It is claimed that fracture of the neck of the femur of whatever type should be treated like any other fracture, by immediate reduction of deformity, by secure fixation of the fragments, and that these essentials of success should be supplemented by the adequate after-care upon which functional recovery is so largely dependent; that such treatment in a comprehensive sense has been made practicable by the abduction method, because it is mechanically adequate for the purpose, as may be demonstrated by x-ray examination at the time of the operation or thereafter; that conventional treatment is mechanically inadequate for the application of surgical principles, because its basis is traction which, at best, is unreliable and, in this instance, usually futile. The chief dependence for security in the treatment of any fracture is the resistance of the apposed fragments. In fracture of the neck of the femur the fragments are in lateral relation and can be brought end to end only in full abduction, when the leverage of the limb opposed to the resistance of the tense capsule forces a contact and assures security. This is a mechanical proposition that should be self-evident. It is because of the admitted inadequacy of conventional methods in the treatment of complete fracture that deformity, seeming to assure contact, is not corrected in spite of the functional disability that it entails.

Dr. Cotton is obsessed by impaction. In his book he states that 90% of hip fractures are impacted. He reviews conventional methods and, with no mention of after-treatment other than that weight should not be borne earlier than eight or ten weeks after the fracture, concludes that the results are good. He has stated elsewhere that: "It is a crime to disturb an impaction in reasonably good position." Furthermore, that fractures at the base of the neck "get well anyhow, with good or bad treatment, while complete intracapsular fractures never unite under routine treatment." I think it is generally conceded that fracture at the base is the common type. Stimson, for example, examined the x-ray pictures of 64 consecutive cases admitted to the New York and Bellevue Hospitals and found fracture at the base in 48, or 79%.

In spite of this potentiality for repair, Cotton now admits, in contrast to his former optimism, that the results are wretched. As I understand his writings, he thinks these results are primarily determined by chance,—the chance of fracture at the base or near the head, the chance of impaction or non-impaction,—and that operative impaction alone holds out a hope for a class of otherwise hopeless cases.

The steps in this operation are to reduce displacement under anesthesia; to mallet the adjusted fragments; to fix the limb in a moderate degree of abduction by a plaster spica, and, judging from the illustrative case treated in the Brigham Hospital, to protect the weak part from weight bearing for many months.

This treatment seems to me decidedly mixed. If Dr. Cotton wishes to test the actual resistance of artificial impaction he should treat the patient as, according to his book, he would treat spontaneous impaction, and permit weight bearing in eight or ten weeks. Malleting an already injured bone can serve no other

purpose than to fix the fragments. And how can one assure more pressure than by the leverage of an extended and abducted limb against a tense capsule?

It seems to me that artificial impaction is simply a modification of the abduction treatment, and that when Dr. Cotton has mastered the mechanics of the abduction method as a means of correcting deformity and assuring security, which his own writings prove that he does not understand, he will extend rational treatment to those cases that uniting "anyhow" furnish a large proportion of the wretched results that he deplures.

In my opinion, wretched results in favorable cases are best explained by wretched treatment, wretched in conception and wretched in every detail from beginning to end.

The claims of the abduction treatment are based upon its demonstrated efficiency in applying surgical principles. It has never been claimed that all patients are amenable to efficient treatment, or that efficient treatment will always assure success. It is claimed that by efficient treatment one may provide the opportunity for repair without which failure is inevitable; consequently, that the result is determined primarily by the character of the treatment and by the skill and experience of the one who applies it.

The point at issue is not of the possible advantage of pet methods in adaptation to special cases, but of the establishment of surgical principles of which all treatment should conform and of which, at the present time, the abduction treatment is the only exponent.

Dr. Moore's modification of the abduction treatment seems to have succeeded admirably in the class of cases for which it was designed. It has, however, certain practical disadvantages in that it is more difficult to apply accurately and that the attitude designed to permit a sitting posture is less suitable for recumbency. I should suppose, also, that fixing the limb in flexion at the hip and knee would induce contractions that might be resistant to correction.

Dr. Lovett's suggestion that traction should be added to abduction to assure security, based on his experience in the correction of coxa vara, seems hardly pertinent. When a normal bone is broken, one aims to restore the normal contour by apposing the fractured surfaces and thus to assure security. In correction of deformity one must necessarily place the fragments in a new relation which precludes accurate apposition to one another. If the abduction method is properly applied the fragments are locked. The addition of traction is not only unnecessary, but would be a great disadvantage in preventing the frequent changes of position that the independent splint permits.

The abduction treatment has been so often misrepresented by its upholders and critics that I take the liberty of referring those who may care to inform themselves on the subject to the *Annals of Surgery* for October, 1914.

ROYAL WHITMAN, M.D.

283 Lexington Ave., New York City, Nov. 1, 1916.

NOTICE OF A COMPETITIVE EXAMINATION FOR QUALIFICATION TO THE POSITION OF EPIDEMIOLOGIST IN THE MASSACHUSETTS STATE DEPARTMENT OF HEALTH.

Although the law leaves the appointment of the Epidemiologist in the hands of the Commissioner of Health, it is the policy of the State Department of Health to hold competitive examinations for such positions and to consider the results of such examinations as the principal basis for selecting appointees.

On Dec. 4, 1916, an examination will be held for qualification to the appointment of Epidemiologist of the Massachusetts State Department of Health.

The written examination will be held on the above date in the examination room of the Civil Service

Commission, State House, Boston. The oral and practical examinations will be held on dates and at places announced at time of written examination.

Persons possessing the necessary qualifications desiring to enter the competitive examination for this position are requested to communicate with the State Commissioner of Health, State House, Boston, at once. Upon such written application, a list of rules and regulations governing the appointment, and an application blank will be forwarded.

Admission to the examination is governed by the regulations accompanying this notice. Physical fitness is a necessary prerequisite, but no percentage credits are given on physique. The examination comprises written, oral and feasible practical tests.

A relative rating will be established on the basis of:

- A. Previous experience in epidemiological work—maximum, 20 points.
- B. Results of oral examination—maximum, 20 points.
- C. Results of written examination—maximum, 60 points.

A. J. McLAUGHLIN, M.D.,

Commissioner of Health.

November 3, 1916.

STATE DEPARTMENT OF HEALTH OF MASSACHUSETTS. REGULATIONS GOVERNING THE APPOINTMENT OF AN EPIDEMIOLOGIST.

1. Number of appointments.

There will be one appointment made to the position of Epidemiologist.

2. Form of application for appointment.

Candidates for the position of Epidemiologist must make application addressed to the Commissioner of Health, in their own handwriting, asking permission to appear before a Board of Examiners. Candidates shall state their age, date and place of birth, present legal residence, names of colleges or institutions of learning of which they are graduates, date of graduation, and shall furnish testimonials as to their experience and moral character.

3. Time limit for applications.

All applications must be on file in the office of the State Department of Health at least ten days before the date scheduled for the examination.

4. Age limit.

No candidates shall be eligible to appear before the Board of Examiners whose age is less than 23 or more than 35.

5. Professional requirements.

Candidates shall be graduates of an incorporated medical school.

6. Citizenship.

All candidates must be citizens of the United States, and preference in appointment will be given to residents of Massachusetts.

7. Physical examination.

Candidates for appointment must pass a satisfactory physical examination before a Board of Examiners.

8. Scope of examination.

All examinations of candidates for the appointment of Epidemiologist shall be conducted by a Board of Examiners. These examinations shall include physical, oral, written and practical tests in the subjects outlined in the succeeding sections.

9. Board of examiners.

The Board of Examiners shall consist of three or more members. These members shall be selected by the Commissioner of Health, from the Public Health Council or other officials of the Department.

10. Subjects for written examinations.

All candidates for appointment must pass a satisfactory written examination in epidemiology, communicable diseases, preventive medicine and vital statistics.

11. *Compensation.*

The compensation of the Epidemiologist shall be \$2,000 per year at the beginning.

12. *Tenure of office.*

The Epidemiologist may be removed from office by the Commissioner of Health because of gross misconduct or inefficiency, but only after the accused officer has been furnished with a copy of the charges made against him and given a hearing thereon by the Public Health Council.

CHANGES IN THE MEDICAL CORPS, U. S. NAVY, FOR THE TWO WEEKS ENDING OCTOBER 28, 1916.

October 14.

P. A. Surgeon W. H. Connor, detached *Kansas* to *Olympia*.

October 16.

Asst. Surgeon R. M. Waterhouse, to *Melville*.

Asst. Surgeon E. K. Lee, M.R.C., commissioned from Sept. 18, 1916.

October 18.

Medical Director T. A. Berryhill, from Great Lakes Hospital to Mare Island Hospital.

Medical Director M. F. Gates, from Mare Island Hospital to Newport Hospital.

Medical Director L. W. Curtis, from Newport Hospital to Great Lakes Hospital.

P. A. Surgeon P. B. Ledbetter, from Naval Hospital, Las Animas, to Training Station, Great Lakes, Ill.

P. A. Surgeon A. H. Allen, from *Texas* to *Louisiana*.

P. A. Surgeon L. M. Schmidt, from *Louisiana* to Norfolk Hospital.

P. A. Surgeon L. C. Whiteside, to Las Animas Hospital.

Asst. Surgeon R. A. Torrance, to *Texas*.

Asst. Surgeon F. H. Bowman, to *Colorado*.

NOTE: Surgeon J. H. Holloway, retired, died at Albuquerque, N. M., August 2, 1916.

October 24.

Surgeon W. H. Rennie, resignation accepted, effective Nov. 1, 1916.

P. A. Surgeon T. W. Reed, detached Naval Hospital, Norfolk, Va., to Asiatic Station, via November transport.

October 25.

P. A. Surgeon H. L. Kelley, to command Naval Hospital, Port Royal, S. C.

October 28.

P. A. Surgeon S. D. Hart, from Newport Training Station to *Maumee*.

A. A. Surgeon H. A. Giltner, appointed from October 21, 1916, to Navy Recruiting Station, Parkersburg, W. Va.

SOCIETY NOTICES.

BOSTON SOCIETY FOR MEDICAL IMPROVEMENT.—A meeting of the Society will be held in Sprague Hall, Boston Medical Library, on Monday, November 20, 1916, at 8.15 P.M.

PROGRAM

Memorial Addresses, "Dr. William P. Bolles,"

Dr. Charles F. Withington

Dr. Edward Waldo Emerson

Paper on "Sanatoria." Dr. Edward L. Parks

9.00 P.M., Business Meeting.

Question: The Future of the Society.

Every member is urged to be present.

GILBERT SMITH, Secretary.

99 Commonwealth Avenue.

SUFFOLK DISTRICT MEDICAL SOCIETY.—A regular meeting of the Surgical Section will be held at the

Boston Medical Library on Nov. 22, at 8 P.M.

I. Dr. F. B. Mallory, Boston, "The Pathology of Acute Pancreatitis." (With lantern slides.)

II. Dr. John B. Deaver, Philadelphia, "The Surgical Aspects of Pancreatitis." (With lantern slides.)

The discussion of these papers will be introduced by Dr. Joseph H. Pratt and Dr. Franklin G. Balch, Boston.

W. J. MINTER, M.D.,

Secretary.

CHARLES L. SCUDDER, M.D.,

Chairman.

APPOINTMENTS.

MASSACHUSETTS STATE DEPARTMENT OF HEALTH.—Dr. Walter H. Brown, epidemiologist* of the Massachusetts State Board of Health, resigned his position on November 1, to accept an appointment as executive officer of the board of health of Bridgeport, Conn.

NORTHWESTERN UNIVERSITY.—Dr. Frederic A. Besley has been appointed professor of surgery and Dr. Roy G. Hoskins, associate professor of physiology in the Northwestern University Medical School.

UNIVERSITY AND BELLEVUE HOSPITAL.—Dr. P. V. Previtt has been appointed instructor in physiology, and Dr. E. R. Hoskins and Dr. J. L. Connel, instructors in anatomy at the University and Bellevue Hospital Medical College.

UNIVERSITY OF ILLINOIS.—Dr. L. V. Heilbrun has been appointed instructor in microscopic anatomy at the College of Medicine at the University of Illinois.

UNIVERSITY OF NEBRASKA.—Dr. H. E. Eggers has been appointed professor of pathology and bacteriology, Dr. Amos W. Peters, assistant professor of biochemistry, and Dr. John T. Myers, instructor in bacteriology, in the College of Medicine of the University of Nebraska, Omaha.

MCGILL UNIVERSITY.—Dr. Ardrey W. Downs, formerly professor of physiology at the Medico-Chirurgical College, Philadelphia, has been appointed professor of physiology at McGill University, Montreal.

UNITED STATES HOSPITAL, Manila.—Dr. Fernando Calderos has been appointed director of the United States Government Hospital at Manila in succession to Dr. William E. Musgrave, professor of surgery, and dean of the Medical College of the University of the Philippines.

HARVARD UNIVERSITY.—Dr. Charles L. Scudder, formerly lecturer on surgery, has been appointed assistant professor of surgery in the Harvard Medical School.

RECENT DEATHS.

DR. LEONARD M. BRADLEY of Milton, Mass., who died at Mattapan, Mass., recently, was born in Milton on March 6, 1879, and had practiced his profession as a dentist in Mattapan for a number of years. He is survived by his widow and one son.

DR. LEWIS DARLING, who died recently at Lawrenceville at Tioga County, Pennsylvania, was born there on Oct. 19, 1840, the son of a physician. He received the degree of M.D. in 1866, from the University of Michigan, after having served throughout the Civil War. He immediately settled in his native town, where he continued in the practice of surgery until his death. He is survived by his widow, three sons and three grandsons.

DR. FRANK D. MAINE, who died on October 29, at Springfield, Mass., was born in 1839. He served throughout the Civil War as a volunteer in the Fourteenth Connecticut Infantry, and after teaching for a time, obtained the degree of M.D., in 1872, from the New York Homeopathic Medical College. After practicing his profession successively in Middletown and Windsor Locks, Connecticut, he removed, in 1892, to Springfield, where he continued active in the profession until his death. He is survived by his widow.